2001 ACCESSORIES & EQUIPMENT

Analog Instrument Panels - Blazer, Bravada, Jimmy, Sonoma & S10 Pickup

DESCRIPTION

WARNING: Deactivate air bag system before performing any service operation. See appropriate AIR BAG RESTRAINT SYSTEMS article. DO NOT apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

Instrument Panel Cluster (IPC) uses analog speedometer and gauges. Tachometer is standard equipment on Bravada. Tachometer is optional on all other models. See **Fig. 1** or **Fig. 2** . IPC contains a microprocessor. Communication with other modules is transmitted over Class 2 serial data bus. Instrument cluster gauges and indicators are provided input from microprocessor or directly from sending units or sensors.

Driver Information Center (DIC) consists of a multi-function electronic display placed in the overhead console. The DIC displays the following information:

- Vehicle fuel information.
- Outside temperature.
- Current vehicle direction.

Display is cycled, changed and acknowledged using US/MET and MODE buttons, located on DIC.

The audible warnings alert the driver of a system concern or a critical vehicle condition. The Body Control Module (BCM) generates the audible warnings through an internal speaker. The BCM emits audible warnings based on various inputs. If the BCM receives multiple audible warning requests, the warning with the highest priority sounds first.

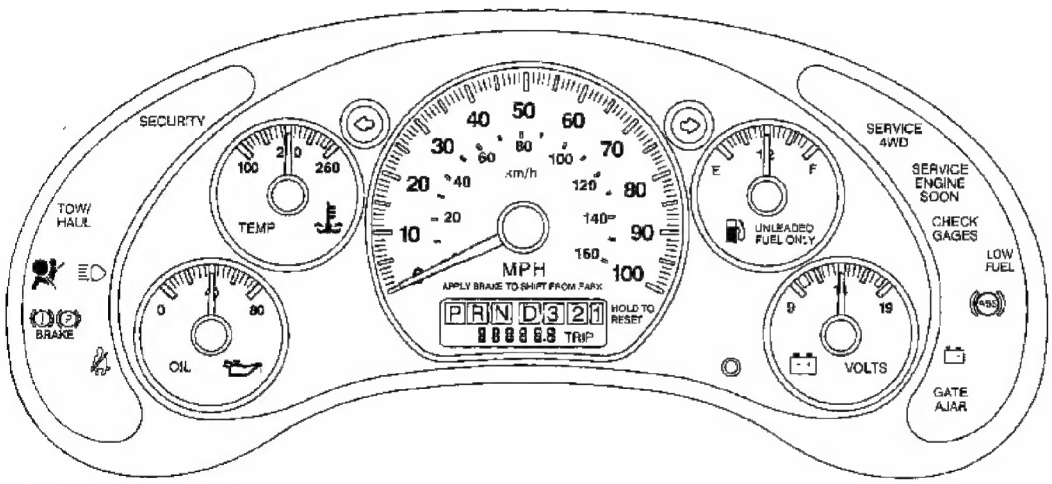

Fig. 1: Identifying Gauges & Indicator Lights (Without Tachometer)
Courtesy of GENERAL MOTORS CORP.

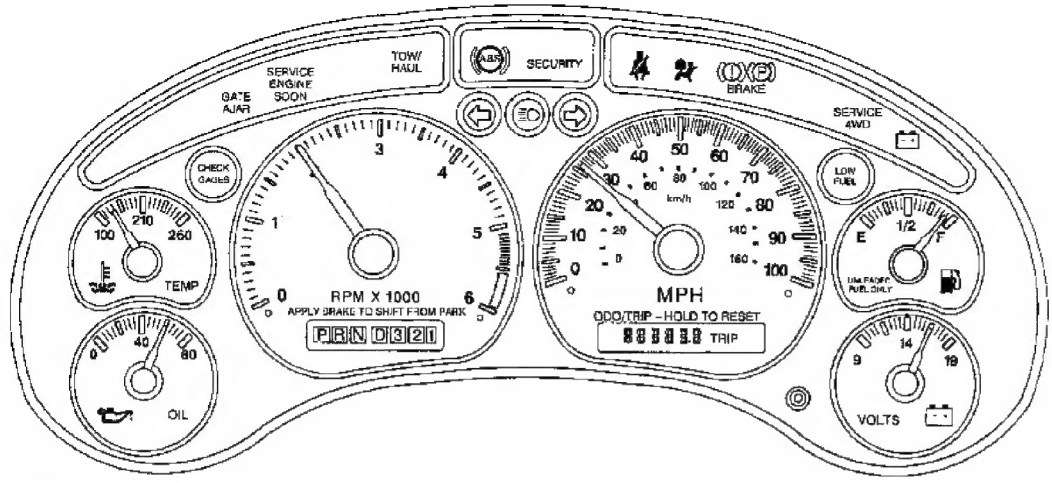

Fig. 2: Identifying Gauges & Indicator Lights (With Tachometer)
Courtesy of GENERAL MOTORS CORP.

OPERATION

AUDIBLE WARNINGS

Fasten Safety Belt Warning

The Body Control Module (BCM) activates the fasten safety belt audible warning, and also sends a class 2 message to the IPC to illuminate the fasten safety belt indicator when the ignition switch is in RUN and the seat belt is not fastened.

Key-In-Ignition Warning

The Body Control Module (BCM) sounds the key-in-ignition warning when driver door is open with key in ignition. The chime will sound until the condition is cleared.

Lights On Warning

The Body Control Module (BCM) sounds lights on warning when light switch is in PARK or LIGHT position with ignition key in any position except RUN or START. The chime will sound until the condition is cleared.

Low Fuel Warning

The Body Control Module (BCM) sounds low fuel warning when Powertrain Control Module (PCM) requests via class 2 data link. PCM declares alarm condition when fuel level falls below a predetermined value.

DRIVER INFORMATION CENTER

COMP/TEMP Mode

Mode consists of two separate functions:

- **COMPASS**

  In the Compass Mode, one of eight compass readings (N, NE, E, SE, S, SW, W, and NW) will be displayed to indicate the direction the vehicle is facing.

- **TEMP**

  In the Temperature Mode, the outside air temperature is displayed in either °C or °F. If the outside air temperature is below 3°C (37°F), the display will toggle between ICE and the current outside air temperature in 8-second increments.

Trip Mode

Mode consists of following functions:

- **AVG ECON**

  The DIC displays the average fuel economy since the last reset.

- **AVG SPEED**

The DIC displays the average speed since the last reset.

- **FUEL USED**

  The DIC displays the amount of fuel used since the last reset.

- **INST ECON**

  The DIC displays the instantaneous fuel economy since the last second of driving.

- **RANGE**

  The DIC displays the estimated distance that can be travelled with the remaining fuel in the tank, based on the fuel economy for the last few hours of driving.

GAUGES

Coolant Temperature

Powertrain Control Module (PCM) uses Class 2 serial data communications in order to inform the Instrument Panel Cluster (IPC) of engine coolant temperature. IPC operates temperature gauge in order to appropriately display engine coolant temperature. PCM determines coolant temperature by measuring signal voltage from a variable resistance sensor in the engine coolant jacket when ignition switch is in RUN position. As coolant temperature increases, sensor resistance decreases.

Fuel

Instrument Panel Cluster (IPC) operates fuel gauge by class 2 serial data messages from Powertrain Control Module (PCM). Fuel gauge indicates quantity of fuel in tank when ignition switch is in RUN position. When ignition switch is turned to OFF, LOCK, START or ACC position, pointer may come to rest at any position. PCM/VCM receives an input from fuel level sensor. Fuel level sensor is inside of fuel tank, and has a variable resistor that is controlled by the float. When fuel tank is full and ignition switch is in RUN position, PCM should receive a high resistance due to position of float. PCM interprets this signal and sends a class 2 serial data message to IPC indicating percentage of fuel in tank. Indicator on fuel gauge then moves to maximum position or FULL on gauge face. When fuel tank is empty, float in fuel tank is at the lowest position and resistance is low. PCM interprets this signal and sends a class 2 serial data message to IPC indicating percentage of fuel in tank. Indicator on fuel gauge then moves to minimum position or EMPTY on gauge face.

Oil Pressure

Gauge responds directly to resistance of oil pressure sending unit. As oil pressure increases, sending unit resistance increases. Instrument Panel Cluster (IPC) monitors circuit for low oil

pressure condition to determine if CHECK GAUGES indicator should be illuminated.

Speedometer

Vehicle Speed Sensor (VSS) is as permanent magnet signal generator that produces analog output signal proportional to vehicle speed. This signal is processed by Powertrain Control Module (PCM) to produce a digital signal (4000 pulses per mile) that is sent to IPC on designated circuit.

NOTE: Incorrect VSS calibration may adversely affect operation of ABS, engine control system and cruise control system.

Tachometer

Powertrain Control Module (PCM) sends RPM pulses to Instrument Panel Cluster (IPC). IPC processes tach pulses in order to display engine speed on tachometer.

Voltmeter

Voltmeter indicates nominal battery voltage (ignition on, engine off) or charging system voltage (engine on). Normal range is 10-16 volts. Voltmeter has a Red band at each extreme end of its range to indicate charging system problem.

INDICATOR LIGHTS

NOTE: Light Emitting Diodes (LEDs) are used on all indicator lights except turn signal indicators, which use incandescent bulbs.

AIR BAG

LED is controlled by Supplemental Inflatable Restraint (SIR) Sensing Diagnostic Module (SDM) on Class 2 serial data line. As a check, LED flashes 7 times after ignition is turned on. LED illuminates when one or more of the following conditions exists:

- SIR system related DTC is set.
- Instrument cluster cannot communicate with SDM on Class 2 serial data line.
- Instrument cluster receives a Class 2 serial data message from SDM requesting AIR BAG indicator on.

Anti-Lock

LED is controlled by IPC, using information sent by Electronic Brake Control Module (EBCM) on Class 2 serial data line. If light is on, brake system will still operate, but without anti-lock assistance. As a check, LED illuminates for 3 seconds after ignition is turned on. LED illuminates when one or more of the following conditions exists:

- Anti-lock brake system related DTC is set.
- Instrument cluster cannot communicate with EBCM on Class 2 serial data line.
- Instrument cluster receives a Class 2 serial data message from EBCM requesting ANTI-LOCK indicator on.

WARNING: If BRAKE light is on, ensure brake hydraulic system is okay before driving vehicle.

Battery

LED is controlled by IPC, using Class 2 serial data information sent by Vehicle Control Module/Powertrain Control Module (VCM/PCM). LED will remain on while ignition is turned on, engine is started and for 3 seconds after key is released to RUN position. If generator is charging, VCM/PCM will command LED off.

Brake

BRAKE LED is controlled by Electronic Brake Control Module (EBCM) and Body Control Module (BCM) on Class 2 serial data line. LED illuminates when one or more of the following conditions exists:

- Low brake pressure condition exists.
- Low brake fluid condition exists.
- EBCM cannot control ANTI-LOCK indicator.
- Brake pressure differential switch is closed.
- BCM sends Class 2 serial data message to instrument cluster indicating parking brake is set.
- Instrument cluster receives Class 2 serial data message from EBCM requesting BRAKE indicator on.
- As a check, LED illuminates for 3 seconds after ignition is turned on.

CHECK GAUGES

If coolant temperature is too high or oil pressure is too low, LED illuminates to alert driver of condition indicated by gauges. IPC constantly monitors coolant temperature and oil pressure with engine running. Engine coolant information is sent to IPC over Class 2 serial data line from Powertrain Control Module (PCM). Oil pressure information is sent to IPC over designated circuit connected to oil pressure sending unit. As a check, LED illuminates for 3 seconds after ignition is turned on.

Gate Ajar

LED is controlled by IPC. LED illuminates when IPC receives Class 2 data from Body

Control Module (BCM), indicating tailgate is ajar.

High Beam

High beam indicator light has a replaceable bulb that is located in Instrument Panel Cluster (IPC). Body Control Module (BCM) sends a class 2 serial data message to instruct IPC when to turn ON or when to turn OFF high beam indicator light. If BCM detects that high beams are ON, it will instruct IPC to turn ON the high beam indicator light.

Low Fuel

If fuel level is low, LED illuminates to alert driver of condition indicated by gauge. IPC monitors Class 2 serial data bus for information from Powertrain Control Module (PCM). As a check, LED illuminates for 3 seconds after ignition is turned on.

PRNDL (Park, Reverse, Neutral, Drive, Low)

Gear position display (vacuum florescent) will illuminate when Instrument Panel Cluster (IPC) receives information over Class 2 serial data bus from Powertrain Control Module (PCM). Gear position display is surrounded by a moveable square flag. Position of moveable square flag is sent to IPC from transmission range switch over Class 2 serial data bus. If vehicle is equipped with column shift, Park position switch must also be closed for IPC to display Park position.

Seat Belt

Seat belt LED works in conjunction with a buzzer. Body Control Module sends a message to Instrument Panel Cluster (IPC) over Class 2 serial data bus. If seat belt is not fastened when key is turned to RUN position, buzzer will sound for 8 seconds and LED will illuminate solid for 20 seconds and flash for 55 seconds. Buzzer will stop and LED will turn off if belt is fastened during 8-second interval. If seat belt is fastened when key is turned to RUN position, no buzzer will sound and LED will illuminate solid for 75 seconds. If seat belt is unfastened during 8-second interval, buzzer will sound for remainder of 8-second interval.

Security

Body Control Module (BCM) sends a class 2 serial data message to inform Instrument Panel Cluster (IPC) when to turn on or flash SECURITY indicator. As a check, SECURITY indicator illuminates briefly when key is turned to RUN position, until engine starts. If SECURITY indicator flashes, system has entered a tamper mode. If SECURITY indicator stays on while driving, system malfunction exists and vehicle will not be protected by security system. A system related DTC may be stored.

Service Engine Soon

LED is controlled by Powertrain Control Module (PCM). As a check, LED illuminates when key is turned to RUN position. LED should turn off 1-5 seconds after engine starts. If a

problem occurs in engine control system, PCM illuminates LED and a DTC may be stored. SERVICE ENGINE SOON light may be referred to as Malfunction Indicator Light (MIL).

SERVICE 4WD

Automatic Transfer Case (ATC) module sends a class 2 serial data message to Instrument Panel Cluster (IPC) to instruct IPC when to turn on SERVICE 4WD indicator. SERVICE 4WD indicator illuminates when one or more of the following conditions exists:

- System related DTC is set.
- Instrument cluster cannot communicate with ATC module on Class 2 serial data line.
- Instrument cluster receives a Class 2 serial data message from ATC module requesting SERVICE 4WD indicator on.

Turn Signals

Turn signal indicator lights have replaceable bulbs located in Instrument Panel Cluster (IPC). Turn signal indicator lights are directly operated by turn signal switch and flasher.

Up-Shift (M/T)

UP-SHIFT indicator illuminates to tell driver when to upshift for best fuel economy. UP-SHIFT indicator turns on when Instrument Panel Cluster (IPC) receives a class 2 serial data message from Powertrain Control Module (PCM) if parameters are met. PCM monitors engine speed, load and throttle position for light control.

TRIPMETER BUTTON

Pressing and holding tripmeter button on cluster for 2 seconds resets trip mileage to zero. If battery is disconnected, tripmeter will lose its memory.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location
Body Control Module	Under Right Side Of Dash, On Heater Case
Connector C101	Engine Harness-To-Body Harness, Right Side Of Engine Compartment, Near PCM
Connector C104	Left Side Of Engine Compartment, Near Fuel Pressure Sensor
Coolant Temperature Sensor	
2.2L	Front Center Of Engine, In Water

	Outlet Pipe
4.3L	In Left Cylinder Head
I/P Fuse Block	On Left End Of Instrument Panel
Oil Pressure Sending Unit	
2.2L	Right Side Of Engine, Forward Of Coil Pack
4.3L	Below Distributor
Outside Air Temperature Sensor	Front Center Of vehicle, To Left Of Hood Latch Support
Powertrain Control Module	Right Side Of Engine Compartment
Electronic Brake Control Module	Underhood, On Left Inner Fenderwell

AIR BAG PRECAUTIONS

Observe following precautions when working with vehicles equipped with Supplemental Inflatable Restraint (SIR) system:

- Before performing any instrument panel testing, diagnosis or repair, disable SIR system by disconnecting negative battery cable and Yellow 2-pin connector at base of steering column.
- Wait 2 minutes before making SIR repairs. SIR system retains enough voltage to deploy air bag after power is disconnected.
- To prevent accidental air bag deployment, avoid SIR wiring harness when trouble shooting instrument panel components. All SIR wires are color-coded Yellow.

PROGRAMMING

COMPASS CALIBRATION

1. Turn ignition switch to ON position, then go to next step.
2. Press MODE button in order to advance Driver Information Center (DIC) display to COMP/TEMP mode. When operation is complete, go to next step.
3. Simultaneously depress and hold US/MET and MODE buttons for approximately 10 seconds. When DIC displays a "C", go to next step.
4. Release both buttons, then go to next step.
5. Drive vehicle in circles at speed of less tan 5 MPH while an assistant observes DIC display. When indication of "C" is replaced by correct compass heading, calibration is complete.

COMPASS MAGNETIC VARIATION ADJUSTMENT

1. Locate current geographic location on map. See **Fig. 3** . When location is established,

go to next step.

2. Turn ignition switch to ON position, then go to next step.
3. Depress MODE switch on Driver Information Center and advance to COMP/TEMP mode. When specified mode is selected, go to next step.
4. Simultaneously depress US/MET and MODE buttons on DIC for approximately 5 seconds. When VAR CAL is displayed on DIC, go to next step.
5. Release US/MET and MODE buttons, then go to next step.
6. Depress US/MET button in order to select proper zone number, then go to next step.
7. Depress MODE button to enter zone number into memory. Variation adjustment is complete.

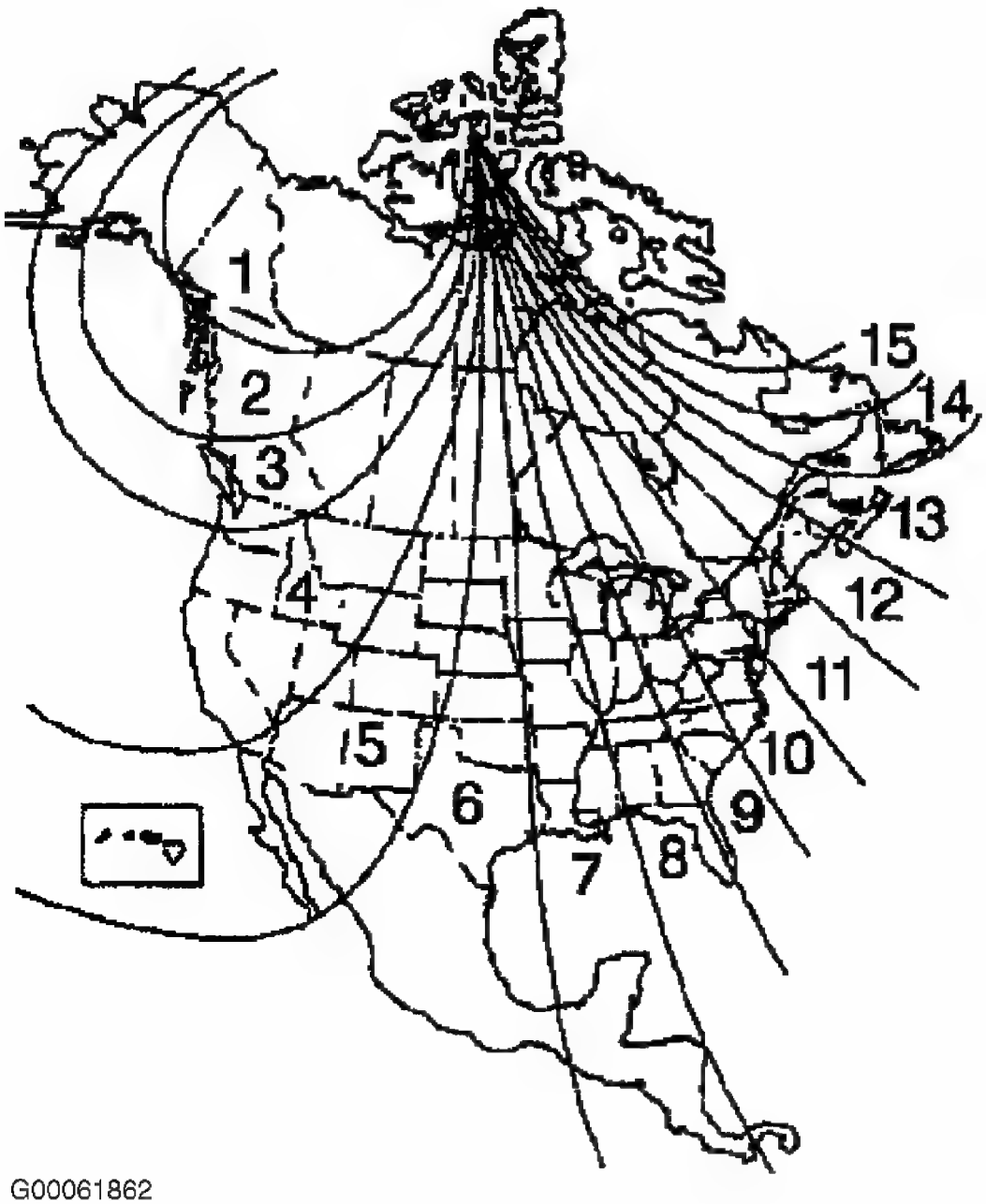

Fig. 3: Compass Magnetic Variation Adjustment
Courtesy of GENERAL MOTORS CORP.

SELF-DIAGNOSTIC SYSTEM

Instrument panel cluster may set Diagnostic Trouble Codes (DTCs) under certain conditions. These DTCs may be retrieved using a scan tool. Other conditions which may set a DTC is a loss of serial data communication with one or more modules on Class 2 serial data line. These DTCs may be caused by an open or short in Class 2 serial data line.

AUDIBLE WARNINGS DIAGNOSTIC SYSTEM CHECK

1. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). If scan tool powers up, go to next step. If scan tool does not power up, see appropriate BODY CONTROL MODULES article.
2. Turn ignition switch to ON position. Using scan tool, attempt to establish communications with the following modules:
   - Body Control Module (BCM).
   - Instrument Panel Cluster (IPC).

   If scan tool establishes communications with specified modules, go to next step. If scan tool does not establish communications with specified modules, see appropriate BODY CONTROL MODULES article.
3. Select DISPLAY DTCs function on scan tool for BCM and IPC. If scan tool displays DTCs, go to next step. If scan tool does not display any DTCs, repair by symptom. See **SYMPTOM INDEX** table under SYSTEM TESTS.
4. If scan tool displays DTC B1000 or a DTC which begin with "U", perform appropriate repair. See appropriate BODY CONTROL MODULES article. If other DTCs are displayed, perform appropriate test. See **DIAGNOSTIC TROUBLE CODE DEFINITIONS** table.

INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK

1. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). If scan tool powers up, go to next step. If scan tool does not power up, see appropriate BODY CONTROL MODULES article.
2. Turn ignition switch to ON position. Using scan tool, attempt to establish communications with the following modules:
   - Automatic Transfer Case (ATC)
   - Body Control Module (BCM)
   - Electronic Brake Control Module (EBCM)
   - Instrument Panel Cluster (IPC)
   - Powertrain Control Module (PCM)
   - Sensing and Diagnostic Module (SDM)

   If scan tool establishes communications with specified modules, go to next step. If scan tool is unable to establish communications with specified modules, see appropriate BODY CONTROL MODULES article.
3. Select DISPLAY DTCs function for the following modules:
   - ATC
   - BCM
   - EBCM

- IPC
- PCM
- SDM

If scan tool displays DTC for the specified modules, go to next step. If no DTCs are retrieved, repair by symptom. See **SYMPTOM INDEX** table under SYSTEM TESTS.

4. If scan tool displays DTCs which begin with a "U" or DTC B1000, see appropriate BODY CONTROL MODULES article. If DTC P0562, P0563, P0621 or P0622 are retrieved, see ENGINE ELECTRICAL DIAGNOSTIC SYSTEM CHECK in appropriate BODY CONTROL MODULES article. If other DTCs are retrieved, perform appropriate test. See **DIAGNOSTIC TROUBLE CODE DEFINITIONS** table.

DIAGNOSTIC TROUBLE CODE DEFINITIONS

DTC (1)	Description
B1367	Instrument Panel Cluster Ignition 0 Circuit Low
B2961	Key In Ignition Circuit Malfunction
P0461	Fuel Sending Unit Fault
P0462	Fuel Level Signal Low
P0463	Fuel Level Signal High
P0608	Vehicle Speed Out Of Range
P0654	Engine Speed Out Of Range
(1) DTCs listed in this table are only for testing procedures covered in this article. For a complete list of DTCs, see appropriate BODY CONTROL MODULES article.	

DIAGNOSTIC TESTS

DTC B1367: IPC IGNITION 0 CIRCUIT LOW

Circuit Description

When ignition switch is in UNLOCK position, certain class 2 messages do not transmit. Instrument Panel Cluster (IPC) suspends operation of indicators and gauges that are dependent on these messages until ignition switch is no longer in UNLOCK position. DTC sets when ignition 0 voltage circuit is less than 75 percent of battery voltage for more than one second. When DTC is in effect:

- Odometer and PRNDL displays do not illuminate.
- Fuel gauge and engine coolant temperature gauges default to minimum indication.
- Scan tool does not communicate with IPC.

Diagnostic Aids

When instrument cluster detects low voltage at ignition 0 voltage circuit, instrument cluster will not communicate with scan tool. Odometer and PRNDL displays will not illuminate. Season odometer will display if trip reset switch is pressed, and instrument cluster will communicate with scan tool until trip reset switch is released. DTC B1367 can only be read by scan tool as a history code once fault is removed. An intermittent condition is likely to be caused by an open condition in ignition 0 voltage circuit.

DTC B2961: KEY IN IGNITION CIRCUIT MALFUNCTION

Circuit Description

Body Control Module (BCM) monitors ignition key alarm switch. When key is in ignition, ignition key alarm switch is closed (signal circuit is low). When the key is not in ignition, ignition key alarm switch is open (signal circuit is high).

Diagnostic Procedure

1. If audible warnings diagnostic system check has been performed, go to next step. If audible warnings diagnostic system check has not been performed, see **AUDIBLE WARNINGS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Using scan tool, observe KEY IN IGNITION parameter in Body Control Module (BCM) 1 Input data list. If KEY IN IGNITION parameter indicates YES, go to next step. If parameter does not indicate YES, go to step 4 .
3. While observing KEY IN IGNITION parameter on scan tool, turn ignition switch to OFF position. If parameter displays ACTIVE when ignition switch is turned to OFF, go to step 7 . If operation is not as specified, go to step 11 .
4. Turn ignition switch to OFF position. Disconnect BCM connector C2. Connect a test lamp between BCM connector C2 terminal B9 (Light Green wire) and ground. See **Fig. 4** . Place key in ignition. If test lamp illuminates, go to step 8 . If test lamp does not illuminate, go to next step.
5. Check Light Green wire between ignition key alarm switch and BCM. See **WIRING DIAGRAMS** . Check circuit for open or high resistance. Repair circuit as necessary, then go to step 12 . If no problem is found, go to next step.
6. Check Tan wire between ignition key alarm circuit and connector C211 terminal B4. Check Black wire between connector C211 terminal B4 and ground. See **Fig. 5** . See **WIRING DIAGRAMS** . Check wiring for open or high resistance. Repair circuit as necessary, then go to step 12 . If no problems are found, go to step 9 .
7. Check Pink wire between IPC connector terminal A7 and fuse block GAUGES fuse (10-amp). See **Fig. 6** . See **WIRING DIAGRAMS** . Check circuit for short to voltage. Repair wiring as necessary, then go to step 12 . If no problem is found, go to step 11 .

8. Check BCM connectors for poor connection or corroded terminals. Repair connection as necessary, then go to step 12 . If no problem is found, go to step 11 .
9. Check ignition switch connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 12 . If no problem is found, go to next step.
10. Replace ignition switch. See appropriate STEERING COLUMN SWITCHES article. When repair is complete, go to step 12 .
11. Replace BCM. See appropriate BODY CONTROL MODULES article. When repair is complete, go to next step.
12. Using scan tool, clear DTCs. Turn ignition switch to ON position and monitor for DTCs. If DTC B2961 resets, go to step 2 . If DTC does not reset, repair is complete.

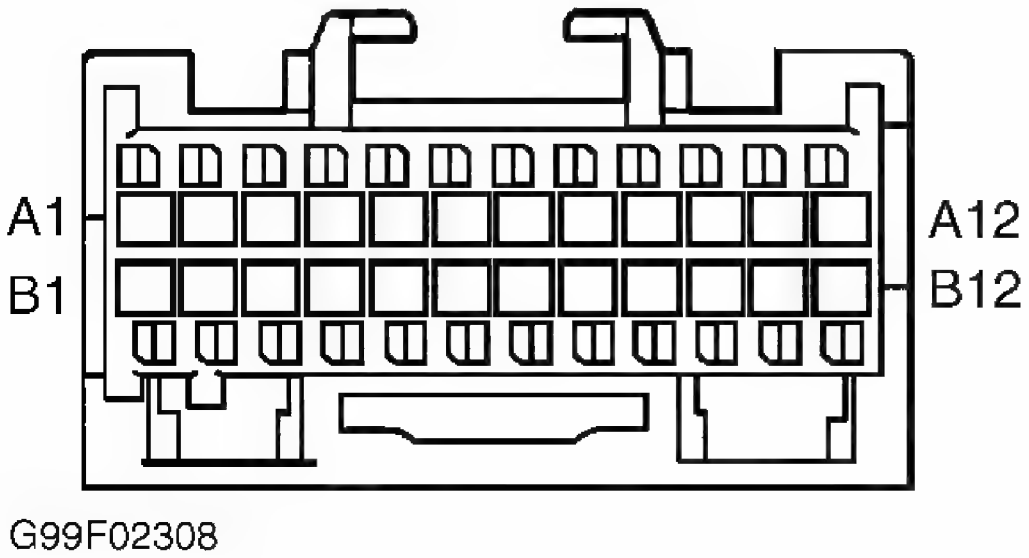

Fig. 4: Identifying Body Control Module Connector C2 Terminals
Courtesy of GENERAL MOTORS CORP.

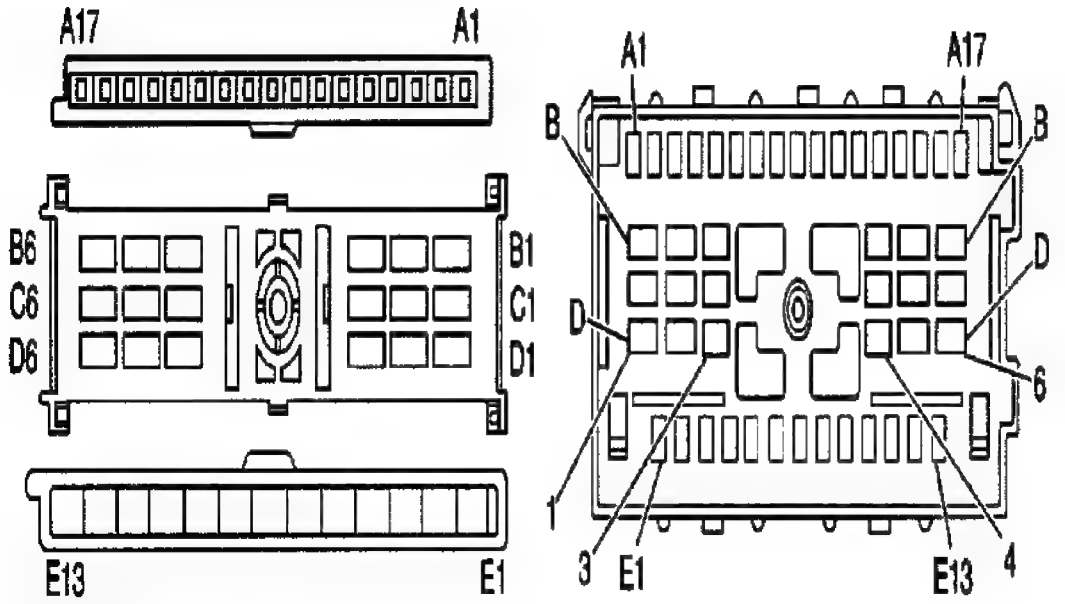

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Fig. 5: Identifying Connector C211 Terminals
Courtesy of GENERAL MOTORS CORP.

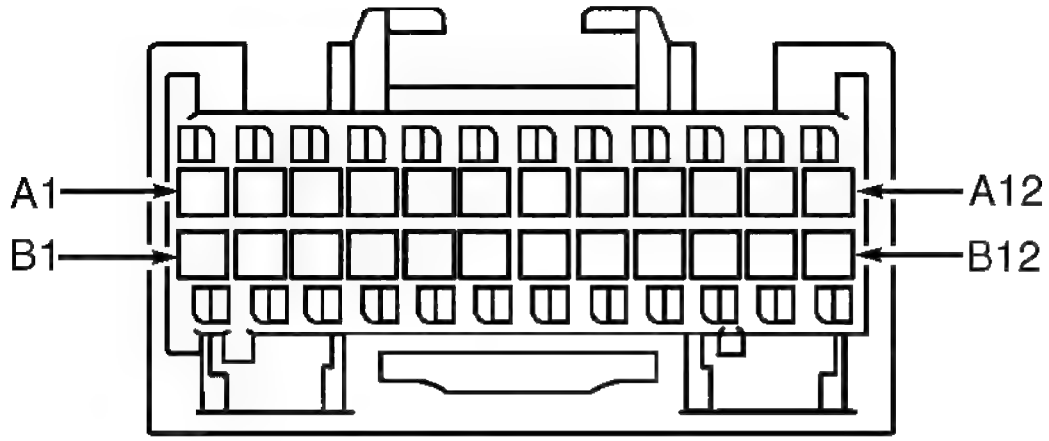

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Fig. 6: Identifying Instrument Panel Cluster Terminals
Courtesy of GENERAL MOTORS CORP.

DTC P0461: FUEL SENDING UNIT FAULT

Circuit Description

Fuel level sender changes resistance based on fuel level. Powertrain Control Module (PCM) monitors signal circuit of fuel level sender in order to determine fuel level. When fuel tank is full, sender resistance is high and PCM senses a high signal voltage. When fuel tank is empty, sender resistance is low and PCM senses a low signal voltage. PCM uses signal circuit of fuel level sender in order to calculate the total remaining fuel percentage in the tank. PCM sends fuel level percent via class 2 serial data circuit to Instrument Panel Cluster (IPC) in order to control fuel gauge. Fuel level information is also used for misfire and EVAP diagnostics. This diagnostic tests for a stuck fuel level sender signal. PCM sets this DTC if the fuel level sender signal appears to be stuck based on a lack of signal variation expected during normal operation.

When DTC is set, the following will occur:

- Fuel gauge defaults to EMPTY.
- LOW FUEL indicator illuminates.
- PCM records operating conditions at the time the diagnostic fails. The PCM displays failure information in the FAILURE RECORDS on scan tool.

Diagnostic Procedure

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Remove fuel level sender. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. Check for stuck fuel level sender or foreign material in fuel tank which might interfere with sender operation. Repair sender unit as necessary, then go to step 4 . If no problem is found, go to next step.
3. Replace fuel level sender. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
4. Using scan tool, clear DTCs, then scan for PCM DTCs. If DTC P0461 resets, go to step 2 . If DTC does not reset, repair is complete.

Diagnostic Aids

Use FREEZE FRAME and/or FAILURE RECORDS data in order to locate an intermittent condition. If you cannot duplicate DTC, information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since DTC set. FAIL COUNTER and PASS COUNTER can also aid in determining number of ignition cycles that diagnostic reported a pass and/or fail. Operate the vehicle within same FREEZE FRAME conditions (such as RPM, engine load, vehicle speed, temperature, etc). This will

isolate when DTC fails.

DTC P0462: FUEL LEVEL SIGNAL LOW

Circuit Description

Fuel level sender changes resistance based on fuel level. Powertrain Control Module (PCM) monitors signal circuit of fuel level sender in order to determine fuel level. When fuel tank is full, sender resistance is high and PCM senses a high signal voltage. When fuel tank is empty, sender resistance is low and PCM senses a low signal voltage. PCM uses signal circuit of fuel level sender in order to calculate the total remaining fuel percentage in the tank. PCM sends fuel level percent via class 2 serial data circuit to Instrument Panel Cluster (IPC) in order to control fuel gauge. Fuel level information is also used for misfire and EVAP diagnostics. This DTC sets when fuel level signal is less than one percent for greater than 20 seconds. When DTC is in effect, the following occurs:

- Fuel gauge defaults to EMPTY.
- LOW FUEL indicator illuminates.
- PCM records operating conditions at the time the diagnostic fails. The PCM displays failure information in the FAILURE RECORDS on scan tool.

Diagnostic Procedure

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Using scan tool, observe FUEL TANK LEVEL REMAINING parameter in PCM data list. If parameter indicates less than one percent, go to next step. If parameter does not indicate less than one percent, system is functioning properly at this time. Check for intermittent fault. See **DIAGNOSTIC AIDS** .
3. Turn ignition switch to OFF position. Disconnect connector C104. Using scan tool, observe FUEL TANK LEVEL REMAINING parameter in PCM data list. If parameter indicates greater than 99 percent, go to step 5 . If parameter does not indicate greater than 99 percent, go to next step.
4. Check signal circuit of fuel level sender between fuel sender unit and PCM. On 2.2L engines, check Purple wire between fuel level sender connector terminal No. 2 and PCM connector C1 terminal No. 55. See **Fig. 7** and **Fig. 8** . See **WIRING DIAGRAMS** . On 4.3L engines, check Purple wire between fuel level sender connector terminal "A" and PCM connector C2 terminal No. 54. See **Fig. 8** and**Fig. 9** . See **WIRING DIAGRAMS** . On all models, check circuit for short to ground. Repair wiring as necessary, then go to step 10 . If no problem is found, go to step 7 .
5. Check Purple wire between connector C104 terminal "E" and fuel level sender

connector terminal No. 2 (2.2L engines) or fuel level sender connector terminal "A" (4.3L engines). See **Fig. 7** ,**Fig. 9** or**Fig. 10** . See **WIRING DIAGRAMS** . Check circuit for short to ground. Repair wiring as necessary, then go to step 10 . If no problem is found, go to next step.

6. Check fuel level sender connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 10 . If no problem is found, go to step 8 .
7. Check PCM connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 10 . If no problem is found, go to step 9 .
8. Replace fuel level sender. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to step 10 .
9. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
10. Using scan tool, clear DTCs. Turn ignition switch to ON position, then monitor for PCM DTCs. If DTC P0462 resets, go to step 2 . If DTC does not reset, repair is complete.

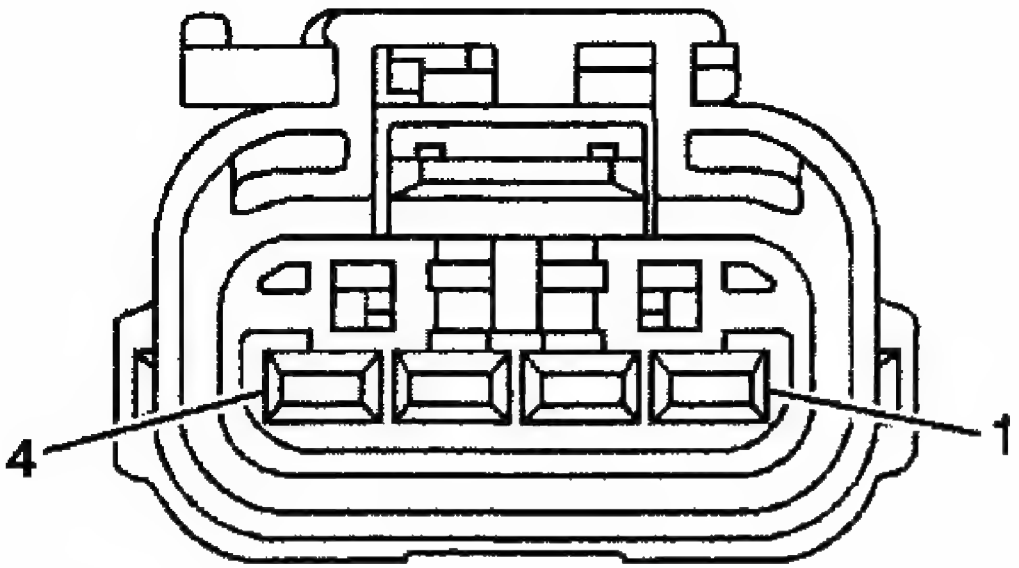


Fig. 7: Identifying Fuel Sender Unit Connector Terminals (2.2L Engines)
Courtesy of GENERAL MOTORS CORP.

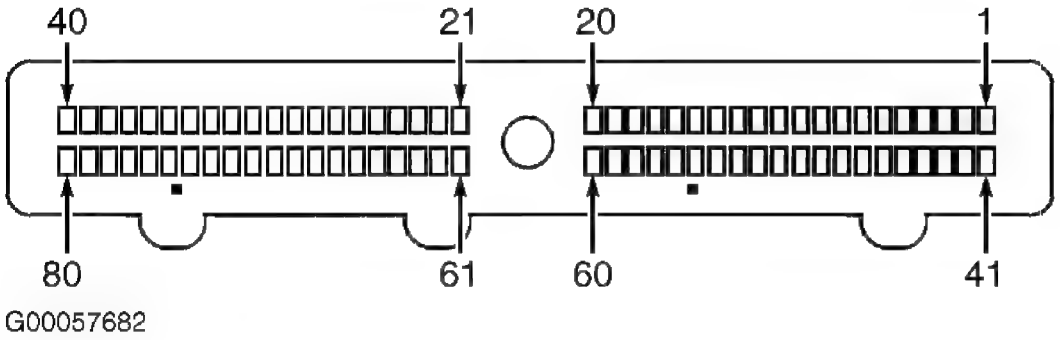


Fig. 8: Identifying Powertrain Control Module Connector C1/C2 Terminals
Courtesy of GENERAL MOTORS CORP.

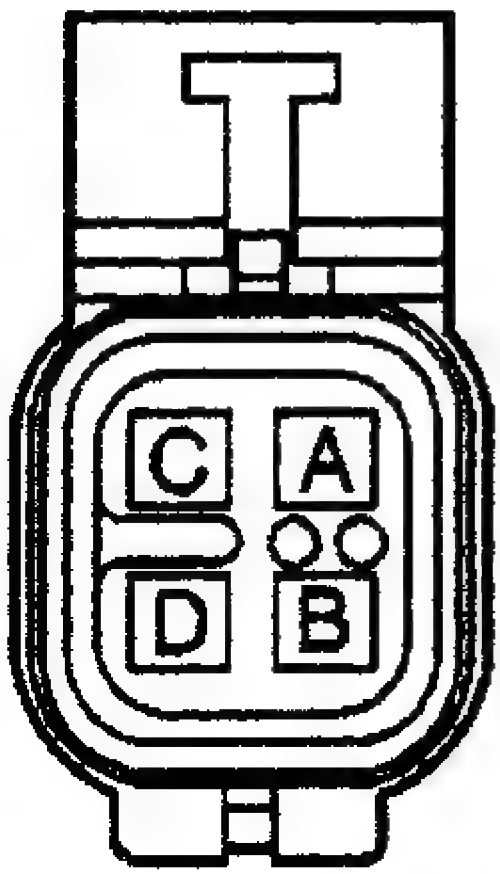
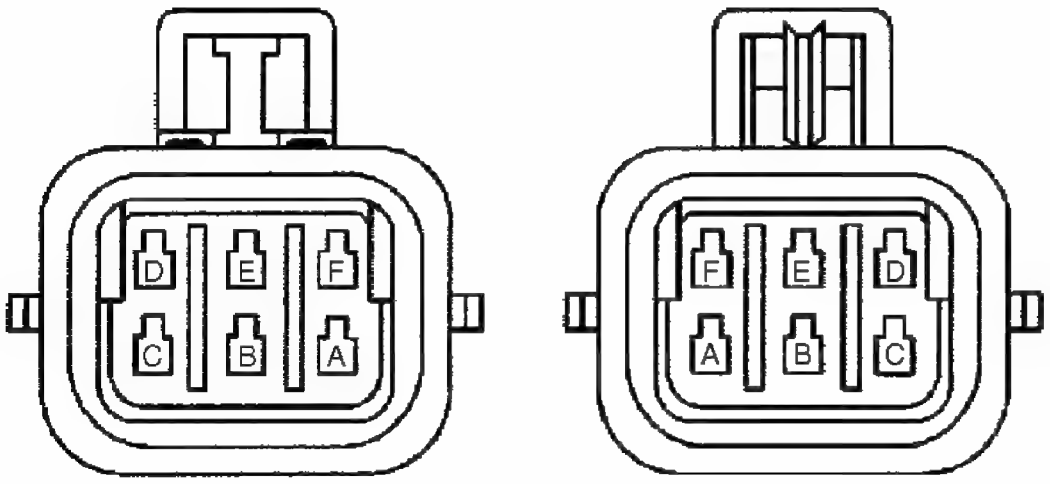


Fig. 9: Identifying Fuel Sender Unit Connector Terminals (4.3L Engines)
Courtesy of GENERAL MOTORS CORP.



G00061857

Fig. 10: Identifying Connector C104 Terminals
Courtesy of GENERAL MOTORS CORP.

Diagnostic Aids

Use FREEZE FRAME and/or FAILURE RECORDS data in order to locate an intermittent condition. If you cannot duplicate DTC, information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since DTC set. FAIL COUNTER and PASS COUNTER can also aid in determining number of ignition cycles that diagnostic reported a pass and/or fail. Operate the vehicle within same FREEZE FRAME conditions (such as RPM, engine load, vehicle speed, temperature, etc). This will isolate when DTC fails.

DTC P0463: FUEL LEVEL SIGNAL HIGH

Circuit Description

Fuel level sender changes resistance based on fuel level. Powertrain Control Module (PCM) monitors signal circuit of fuel level sender in order to determine fuel level. When fuel tank is full, sender resistance is high and PCM senses a high signal voltage. When fuel tank is empty, sender resistance is low and PCM senses a low signal voltage. PCM uses signal circuit of fuel level sender in order to calculate the total remaining fuel percentage in the tank. PCM sends fuel level percent via class 2 serial data circuit to Instrument Panel Cluster (IPC) in order to control fuel gauge. Fuel level information is also used for misfire and EVAP diagnostics. This DTC sets when fuel level signal is greater than 99 percent for more than 20 seconds. When DTC is in effect, the following occurs:

- Fuel gauge defaults to EMPTY.

- LOW FUEL indicator illuminates.
- PCM records operating conditions at time the diagnostic fails. PCM displays failure information in the FAILURE RECORDS on scan tool.

Diagnostic Procedure

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Using scan tool, observe FUEL TANK LEVEL REMAINING parameter in PCM data list. If parameter indicates greater than 99 percent, go to next step. If parameter does not indicate greater than 99 percent, system is functioning properly at this time. Check system for intermittent conditions. See **DIAGNOSTIC AIDS** .
3. Turn ignition switch to OFF position. Disconnect connector C104. Connect a fused jumper wire (3-amp) between fuel level sender signal circuit terminal "E" (Purple wire) and low reference circuit terminal "D" (Orange/Black wire on 2.2L engines, Black wire on 4.3L engines). See **Fig. 10** . Turn ignition switch to ON position. Using scan tool, observe FUEL TANK LEVEL REMAINING parameter in PCM data list. If parameter indicates less than one percent, go to step 6 . If parameter does not indicate less than one percent, go to next step.
4. Check signal circuit of fuel level sender between fuel sender unit and PCM. On 2.2L engines, check Purple wire between fuel level sender connector terminal No. 2 and PCM connector C1 terminal No. 55. See **Fig. 7** and **Fig. 8** . See **WIRING DIAGRAMS** . On 4.3L engines, check Purple wire between fuel level sender connector terminal "A" and PCM connector C2 terminal No. 54. See **Fig. 8** and**Fig. 9** . See **WIRING DIAGRAMS** . On all models, check circuit for open, high resistance or short to voltage. Repair wiring as necessary, then go to step 12 . If no problem is found, go to next step.
5. Check low reference circuit between fuel level sender unit and PCM. On 2.2L engines, check Orange/Black wire between fuel level sender connector terminal No. 4 and PCM connector C1 terminal No. 6. See **WIRING DIAGRAMS** . On 4.3L engines, check Black/White wire between fuel level sender unit connector terminal "D" and connector C104 terminal "D", then check Black wire between connector C104 terminal "D" and PCM connector C1 terminal No. 23. See **Fig. 10** . See **WIRING DIAGRAMS** . On all models, check circuit for open or high resistance. Repair wiring as necessary, then go to step 12 . If no problem is found, go to step 9 .
6. Check signal circuit between connector C104 and fuel level sender. On 2.2L engines, check Purple wire between connector C104 terminal "E" and fuel level sender connector terminal No 2. See **Fig. 7** and**Fig. 10** . See **WIRING DIAGRAMS** . On 4.3L engines, check Purple wire between connector C104 terminal "E" and fuel level

sender connector terminal "A". See **Fig. 9** . See **WIRING DIAGRAMS** . On all models, check circuit for open, high resistance or short to voltage. Repair wiring as necessary, then go to step 12 . If no problem is found, go to next step.

7. Check ground circuit between fuel level sender and connector C104. On 2.2L engines, check Orange/Black wire between fuel level sender terminal No 4 and connector C104 terminal "D". See **WIRING DIAGRAMS** . On 4.3L engines, check Black/White wire between fuel level sender connector terminal "D" and connector C014 terminal "D". See **WIRING DIAGRAMS** . On all models, check circuit for open or high resistance. Repair circuit as necessary, then go to step 12 . If no problem is found, go to next step.
8. Check fuel level sender connector for poor connections and corroded terminals. Repair connection as necessary, then go to step 12 . If no problem is found, go to step 10 .
9. Check PCM connector for poor connections and corroded terminals. Repair connection as necessary, then go to step 12 . If no problem is found, go to step 11 .
10. Replace fuel level sender unit. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to step 12 .
11. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
12. Using scan tool, clear DTCs. Turn ignition switch to ON position and scan for PCM DTCs. If DTC P0463 resets, go to step 2 . If DTC does not reset, repair is complete.

Diagnostic Aids

Use FREEZE FRAME and/or FAILURE RECORDS data in order to locate an intermittent condition. If you cannot duplicate DTC, information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since DTC set. FAIL COUNTER and PASS COUNTER can also aid in determining number of ignition cycles that diagnostic reported a pass and/or fail. Operate the vehicle within same FREEZE FRAME conditions (such as RPM, engine load, vehicle speed, temperature, etc). This will isolate when DTC fails.

DTC P0608: VEHICLE SPEED OUT OF RANGE

Circuit Description

Powertrain Control Module (PCM) creates vehicle speed output signal by pulsing circuit to ground. PCM pulses the circuit at the same rate as vehicle speed signal input. PCM monitors voltage on vehicle speed signal circuit. If PCM determines the voltage is out of the normal operating range, DTC P0608 sets.

Diagnostic Procedure

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT**

PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK under SELF-DIAGNOSTIC SYSTEM.

2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Raise and support vehicle such that drive wheels are off ground. Start engine. On A/T vehicles, place transmission selector lever into DRIVE. On M/T vehicles, shift transmission into 3rd gear. On all models, observe VEHICLE SPEED SENSOR (VSS) parameter in PCM data list. If VSS parameter matches speedometer indication, system is functioning properly at this time. Check wiring and connectors for intermittent fault. See **WIRING DIAGRAMS** . If parameter does not match speedometer indication, go to next step.
3. Turn ignition switch to OFF position. Disconnect PCM connector C2. Connect Signal Generator and Instrument Panel Tester (J33431-C) to PCM connector C2 terminal No. 17 (2.2L engines) or PCM connector C2 terminal No. 50 (4.3L engines) and vehicle ground. See **Fig. 8** . Turn ignition switch to ON position. Using signal generator, set vehicle speed at 55 MPH. If speedometer indicates approximately 55 MPH, go to step 5 . If speedometer does not indicate approximately 55 MPH, go to next step.
4. Check VSS circuit between IPC and PCM. On 2.2L engines, check Dark Green wire between PCM connector C2 terminal No. 17 and IPC connector A4. See **Fig. 6** . See **WIRING DIAGRAMS** . On 4.3L engines, check Dark Green/White wire between PCM connector C2 terminal No. 50 and connector C203 terminal E11. See **Fig. 11** . Check Dark Green wire between connector C203 and IPC connector terminal A4. See **Fig. 6** . See **WIRING DIAGRAMS** . On all models, check circuit for open or short to ground. Repair wiring as necessary, then go to step 9 . If no problem is found, go to step 6 .
5. Check PCM connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 7 .
6. Check IPC connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 8 .
7. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to step 9 .
8. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
9. Using scan tool, clear DTCs. Operate vehicle at engine speed greater than 400 RPM and electrical system between 6 and 14 volts. Monitor for PCM DTCs. If P0608 resets, go to step 2 . If DTC does not reset, repair is complete.

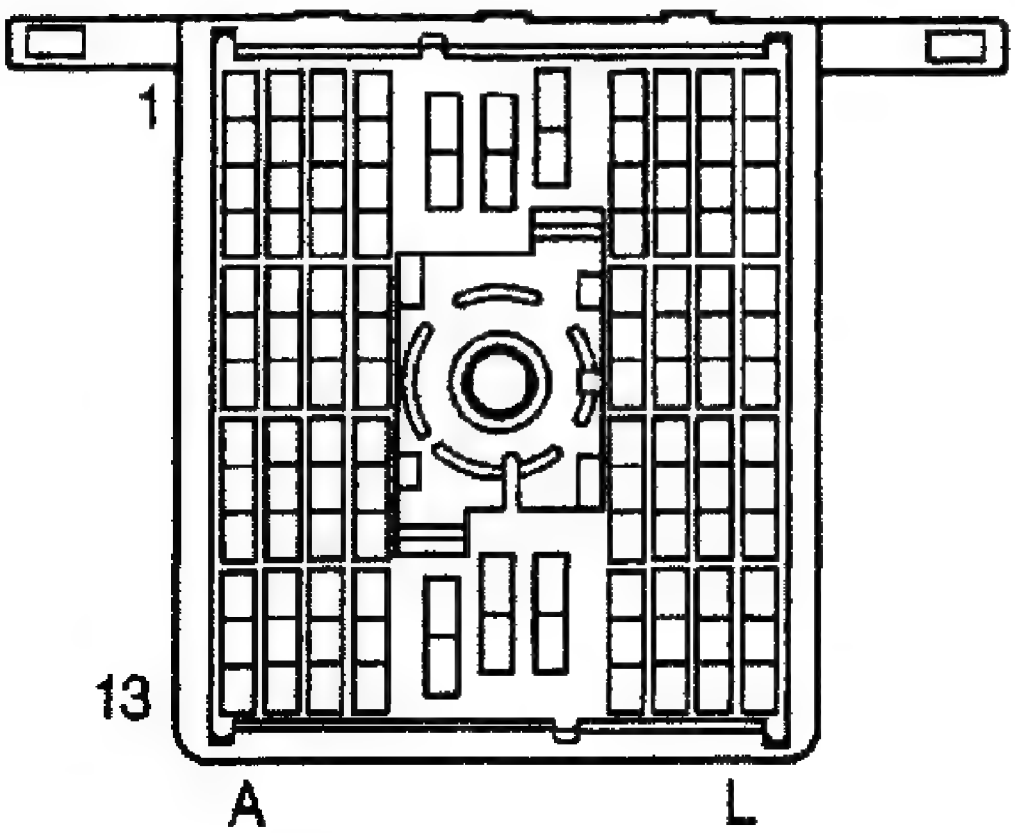


Fig. 11: Identifying Connector C203 Terminals
Courtesy of GENERAL MOTORS CORP.

DTC P0654: ENGINE SPEED OUT OF RANGE

Circuit Description

Powertrain Control Module (PCM) creates engine speed output signal by pulsing circuit to ground. PCM pulses circuit at same rate as engine speed signal input. PCM monitors voltage on engine speed signal circuit. If PCM determines voltage is out of normal operating range, DTC P0654 will set.

Diagnostic Procedure

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC

SYSTEM.

2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Start engine. Using scan tool, observe ENGINE SPEED parameter in PCM data list. If parameter and tachometer indications match, system is functioning properly at this time. Check wiring and connectors for intermittent fault conditions. See **WIRING DIAGRAMS** . If ENGINE SPEED parameter and tachometer do not match, go to next step.
3. Turn ignition switch to OFF position. Disconnect PCM connector C2. Connect Signal Generator and Instrument Panel Tester (J33431-C) to PCM connector C2 terminal No. 10 (White wire) and vehicle ground. See **Fig. 8** . Turn ignition switch to ON position. Set J33431-C to generate a tachometer signal. If tachometer on IPC agrees with generated tachometer signal, go to step 5 . If generated signal and IPC tachometer do not agree, go to next step.
4. Check White wire between PCM connector C2 terminal No. 10 and IPC connector terminal A3. See **Fig. 6** . See **WIRING DIAGRAMS** . Check circuit for open or short to voltage. Repair wiring as necessary, then go to step 9 . If no problem is found, go to step 6 .
5. Check PCM connector for poor connection and corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 7 .
6. Check IPC connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 8 .
7. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to step 9 .
8. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
9. Using scan tool, clear DTCs. Start engine and monitor for PCM DTCs If DTC P0654 resets, go to step 2 . If DTC does not reset, repair is complete.

SYSTEM TESTS

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

CAUTION: Static electricity can destroy integrated circuits in instrument cluster and VSS calibrator. Before servicing these components, ground yourself and work area to discharge static electricity.

NOTE: **After each repair procedure has been completed, reconnect all components. Perform appropriate diagnostic system check. See SELF-DIAGNOSTIC SYSTEM .**

SYMPTOM INDEX

Symptom	Perform Test
Engine Coolant Temperature Gauge Inaccurate Or Inoperative	A
Engine Oil Pressure Gauge Inaccurate Or Inoperative	B
Fuel Gauge Inaccurate Or Inoperative	C
Odometer Trip/Reset Switch Inoperative	D
Speedometer And/Or Odometer Inaccurate Or Inoperative	E
Tachometer Inaccurate Or Inoperative	F
Volt Gauge Inaccurate Or Inoperative	G
Low Fuel Indicator Inoperative	H
PRNDL Display Park Indicator Inoperative	I
Driver Information Center Switches Inoperative	J
Driver Information Center Compass Display Inoperative	K
Driver Information Center Temperature Display Always Reads OC	L
Driver Information Center Temperature Display Always Reads SC	M
Driver Information Center Temperature Display Inaccurate	N
Chime Always On	O
Chime Inoperative	P

TEST A: ENGINE COOLANT TEMPERATURE GAUGE INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Using scan tool, perform COOLANT GAUGE SWEEP TEST. If engine coolant temperature gauge moves up and down when commanded, system is functioning properly at this time. Check wiring and connectors for possible intermittent fault. See **WIRING DIAGRAMS** . If engine coolant temperature gauge does not respond to scan tool, go to next step.
3. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
4. Operate system to verify normal operation. If engine coolant temperature gauge indicates normally, repair is complete. If engine coolant temperature gauge is inaccurate or inoperative, go to step 2 .

TEST B: ENGINE OIL PRESSURE GAUGE INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Start engine and observe engine oil pressure gauge on IPC. If engine oil pressure gauge indicates between 10 and 70 psi, system is functioning properly at this time. Check wiring and connectors in circuit for possible intermittent fault. See **WIRING DIAGRAMS** . If engine oil pressure gauge does not indicate between 10 and 70 psi, go to next step.
3. Turn ignition switch to OFF position. Disconnect engine oil pressure sensor electrical connector. Turn ignition switch to ON position. If engine oil pressure gauge indicates more than 80 psi, go to next step. If engine oil pressure gauge does not indicate more than 80 psi, go to step 6 .
4. Turn ignition switch to OFF position. Connect fused jumper wire (3-amp) between engine oil pressure sensor signal circuit (Tan/White wire) and ground. If engine oil pressure gauge indicates 0 psi, go to step 7 . If engine oil pressure gauge does not indicate 0 psi, go to next step.
5. Check Tan/White wire between engine oil pressure sensor and IPC connector terminal A2. See **Fig. 6** . See **WIRING DIAGRAMS** . Check wiring for open, high resistance or short to voltage. Repair circuit as necessary, then go to step 12 . If no problem is found, go to step 9
6. Check Tan/White wire between engine oil pressure sensor and IPC connector terminal A2. See **Fig. 6** . See **WIRING DIAGRAMS** . Check wiring for short to ground. Repair

circuit as necessary, then go to step 12 . If no problem is found, go to step 9

7. Inspect engine oil pressure sensor case to ground connection for poor contact or corrosion. Repair connection as necessary, then go to step 12 . If no problem is found, go to next step.
8. Check engine oil pressure sensor electrical connection for poor connection or a corroded terminal. Repair connection as necessary, then go to step 12 . If no problem is found, go to step 10 .
9. Check IPC connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 12 . If no problem is found, go to step 11 .
10. Replace engine oil pressure sensor. When repair is complete, go to step 12 .
11. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
12. Operate system and verify proper operation of engine oil pressure gauge. If engine oil pressure gauge operates properly, repair is complete. If engine oil pressure gauge is inaccurate or inoperative, go to step 2 .

TEST C: FUEL GAUGE INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Disconnect connector C104. Connect Signal Generator and Instrument Panel Tester (J33431-C) between connector C104 terminal "E" (Purple wire) and terminal "D" (Orange/Black wire on 2.2L engines, Black wire on 4.3L engines). See **Fig. 10** . Turn ignition switch to ON position. Vary resistance on J33431-C while observing fuel gauge on IPC. When resistance is near 40 ohms, fuel gauge should read EMPTY. When resistance is near 250 ohms, fuel gauge should read FULL. If operation is as specified, go to step 4 . If resistance is not as specified, go to next step.
3. Turn ignition switch to OFF position. Connect scan tool to DLC. Turn ignition switch to ON position. Vary resistance on J33431-C while observing FUEL TANK LEVEL REMAINING parameter in PCM data list. See **FUEL TANK LEVEL SPECIFICATIONS** table. If FUEL TANK LEVEL REMAINING parameter is according to specification, go to step 11 . If parameter is not as specified, go to step 5 .
4. Turn ignition switch to OFF position. Disconnect fuel level sensor electrical connector, then remove fuel level sensor from vehicle. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. Inspect fuel level sensor for misalignment or deformation in fuel tank. On 2.2L engines, check Orange/Black wire between fuel level sensor connector terminal No. 4 and connector C104 terminal "D". See **Fig. 7** . See **WIRING DIAGRAMS** . On 4.3L engines, check Black/White wire between fuel level sender connector terminal "D" and connector

C104 terminal "D". See **Fig. 9** . See **WIRING DIAGRAMS** . On all vehicles, check Purple wire between connector C104 terminal "E" and fuel level sender unit connector terminal No. 2 (2.2L engines) or terminal "A" (4.3L engines). Check all wiring for high resistance or open circuit. Repair as necessary, then go to step 13 . If no problems are found, go to step 7 .

5. On 2.2L engines, check Purple wire between PCM connector C1 terminal No. 55 and fuel level sender connector terminal No. 2. See **Fig. 7** and **Fig. 8** . See **WIRING DIAGRAMS** . On 4.3L engines, check Purple wire between PCM connector C2 terminal No. 54 and fuel level sender connector terminal "A". See **Fig. 8** and **Fig. 9** . See **WIRING DIAGRAMS** . On all vehicles, check circuit for open or high resistance. Repair wiring as necessary, then go to step 13 . If no problems are found, go to next step.
6. On 2.3L engines, check Orange/Black wire between fuel level sender connector terminal No. 4 and PCM connector C1 terminal No. 6. See **WIRING DIAGRAMS** . On 4.3L engines, check Black/White wire between fuel level sender connector terminal "D" and connector C104 terminal "D", then check Black wire between connector C104 and PCM connector C1 terminal No. 23. See **WIRING DIAGRAMS** . On all models, check circuit of high resistance or open. Repair wiring as necessary, then go to step 13 . If no problems are found, go to step 9 .
7. Check fuel level sender for mechanical fault or damaged level arm. Check fuel tank for foreign material. Repair as necessary, then go to step 13 . If no problems are found, go to next step.
8. Connect DVOM between fuel level sender terminals No. 2 and 4 (2.2L engines) or terminals "A" and "D" (4.3L engines). Monitor resistance while moving level arm. If resistance changes smoothy as arm is moved, system is functioning properly at this time. Check connections and wiring for intermittent faults. See **WIRING DIAGRAMS** . If resistance does not vary smoothly as level arm is moved, go to step 10 .
9. Check PCM connector for poor connection or corroded terminals. Repair connector as necessary, then go to step 13 . If no problems are found, go to step 12 .
10. Replace fuel level sensor. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to step 13 .
11. Replace IPC. See **INSTRUMENT PANEL CLUSTER** . When repair is complete, go to step 13 .
12. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
13. Using scan tool, clear PCM DTCs. Operate vehicle to verify proper fuel gauge operation. If fuel gauge operation is normal, repair is complete. If fuel gauge operation is faulty, go to step 2 .

FUEL TANK LEVEL SPECIFICATIONS

Application	Resistance (Ohms)	Fuel Remaining Percentage
18 Gallon Tank (4-Door Utility)	48-63	2-15
88-99		33-38
122-132		53-58
155-165		68-78
210-235		90-95
19 Gallon Tank (2-Door Utility	55-60	11-16
98-103		35-40
130-135		55-60
174-179		77-82
200-235		90-100
18.5 Gallon Tank (Pickup)	48-63	11-16
82-86		35-40
122-126		55-60
164-168		77-82
226-230		90-100

TEST D: ODOMETER TRIP/RESET SWITCH INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Depress TRIP/RESET button while observing odometer operation. If display switched between odometer and trip displays, system is functioning properly at this time. Check wiring and connections for intermittent faults. See **WIRING DIAGRAMS** . If display does not change when TRIP/RESET switch is depressed, go to next step.
3. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
4. Operate TRIP/RESET switch to verify normal operation. If switch operates normally, repair is complete. If switch does not operate normally, go to step 3 .

TEST E: SPEEDOMETER AND/OR ODOMETER INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector

(DLC). Raise and support vehicle such that drive wheels are off ground. Start engine. On A/T models, place transmission selector lever into DRIVE position. On M/T models, shift transmission into 3rd gear. On all vehicles, observe VEHICLE SPEED parameter in PCM ENGINE DATA 1 list. If VEHICLE SPEED parameter matches speedometer indication, go to next step. If parameter and speedometer do not match, go to step 4 .

3. If odometer is operating correctly, system is functioning normally at this time. Check wiring and connectors in system for possible intermittent fault. See **WIRING DIAGRAMS** . If odometer is not operating properly, go to step 9 .
4. Turn ignition switch to OFF position. Disconnect PCM connector C2. Turn ignition switch to ON position. Using DVOM, measure voltage between PCM connector C2 terminal No. 17 (2.2L engines) or No. 50 (4.3L engines) and ground. See **Fig. 8** . See **WIRING DIAGRAMS** . If measured voltage is greater than 9.0 volts, go to step 7 . If measured voltage is not greater than 9.0 volts, go to next step.
5. Check Dark Green/White wire between PCM connector C2 terminal No. 17 (2.2L engines) or No. 50 (4.3L engines) and IPC connector terminal A4. See **Fig. 6** . **WIRING DIAGRAMS** . Check circuit for open or high resistance. Repair circuit as necessary, then go to step 11 . If no problems are found, go to next step.
6. Check IPC connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 11 . If no problem is found, go to step 9 .
7. Check Dark Green/White wire between PCM connector C2 terminal No. 17 (2.2L engines) or No. 50 (4.3L engines) and IPC connector terminal A4. See **Fig. 6** . See **WIRING DIAGRAMS** . Check circuit for short to voltage. Repair circuit as necessary, then go to step 11 . If no problems are found, go to next step.
8. Check PCM connector for poor connections or corroded terminals. Repair connector as necessary, then go to step 11 . If no problems are found, go to step 10 .
9. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to step 11 .
10. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
11. Operate vehicle and verify proper speedometer operation. If speedometer and odometer operate normally, repair is complete. If Speedometer and odometer do not operate normally, go to step 2 .

TEST F: TACHOMETER INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Start engine. Observe ENGINE SPEED parameter in PCM ENGINE DATA 1

list. If ENGINE SPEED parameter matches tachometer indication, system is functioning properly at this time. Check wiring and connectors in system for intermittent fault conditions. See **WIRING DIAGRAMS** . If ENGINE SPEED parameter and tachometer indication do not match, go to next step.

3. Turn ignition switch to OFF position. Disconnect PCM connector C2. Turn ignition switch to ON position. Using DVOM, measure voltage between PCM connector C2 terminal No. 10 and ground. See **Fig. 8** . See **WIRING DIAGRAMS** . If measured voltage is more than 9.0 volts, go to step 6 . If measured voltage is not more than 9.0 volts, go to next step.
4. Check White wire between PCM connector C2 terminal No. 10 and IPC connector terminal A3. See **Fig. 6** . See **WIRING DIAGRAMS** . Check wiring for open circuit or high resistance. Repair as necessary, then go to step 9 . If wiring is okay, go to next step.
5. Check IPC connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 9 . If no problems are found, go to step 7 .
6. Check PCM connector for poor connections or corroded terminals. Repair connection as necessary, then go to step 9 . If no problems are found, go to step 8 .
7. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to step 9 .
8. Replace PCM. See REMOVAL, OVERHAUL & INSTALLATION - TRUCKS article in ENGINE PERFORMANCE. When repair is complete, go to next step.
9. Operate vehicle and ensure tachometer is operating normally. If tachometer operates normally, repair is complete. If tachometer does not operate normally, go to step 2 .

TEST G: VOLT GAUGE INACCURATE OR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Observe BATTERY VOLTAGE parameter in Body Control Module (BCM) data list. If BATTERY VOLTAGE parameter and volt gauge match, system is functioning properly at this time. Check wiring and connectors for intermittent fault conditions. See **WIRING DIAGRAMS** . If BATTERY VOLTAGE parameter and volt gauge do not match, go to next step.
3. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
4. Operate system and ensure volt gauge is operating normally. If volt gauge operates normally, repair is complete. If volt gauge does not operate normally, go to step 2 .

TEST H: LOW FUEL INDICATOR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Using scan tool, perform LAMP TEST in IPC SPECIAL FUNCTIONS. If LOW FUEL indicator illuminates when commanded by scan tool, system is functioning properly at this time. Check wiring and connectors for intermittent fault conditions. See **WIRING DIAGRAMS** . If LOW FUEL indicator does not illuminate when commanded by scan tool, go to next step.
3. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
4. Operate system and verify normal operation. If LOW FUEL indicator operates normally, repair is complete. If LOW FUEL indicator does not operate normally, go to step 2 .

TEST I: PRNDL DISPLAY PARK INDICATOR INOPERATIVE

1. If Instrument Panel Cluster (IPC) diagnostic system check has been performed, go to next step. If IPC diagnostic system check has not been performed, see **INSTRUMENT PANEL CLUSTER DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Turn ignition switch to ON position. Place transmission shift lever into Park position. If PRNDL display identifies PARK ignition, system is functioning properly at this time. Check wiring and connectors for intermittent fault conditions. See **WIRING DIAGRAMS** . If PRNDL display does not identify PARK position, go to next step.
3. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to ON position. Using scan tool, observe PARK SWITCH parameter in IPC data list. If parameter indicates CLOSED, go to step 8 . If parameter does not indicate CLOSED, go to next step.
4. Disconnect park switch electrical connector. Connect fused jumper wire between park switch connector terminal "A" (Dark Green/White wire) and ground. Using scan tool, observe PARK SWITCH parameter on IPC data list. If PARK SWITCH parameter indicates CLOSED, go to step 6 . If parameter does not indicate CLOSED, go to next step.
5. Check Dark Green/White wire between park switch connector and steering column connector C211 terminal A9. Check Orange/Black wire between steering column connector C211 terminal A9 and IPC connector terminal A12. See **Fig. 5** and **Fig. 6** . See **WIRING DIAGRAMS** . Check circuit of open or high resistance. Repair wiring as necessary, then go to step 11 . If no problem is found, go to step 8 .
6. Check Black wire between park switch connector and ground for open or high resistance. See **WIRING DIAGRAMS** . Repair wiring as necessary, then go to step

11 . If wiring is okay, go to next step.

7. Check park switch connector for poor connection or corroded terminals. Repair connector as necessary, then go to step 11 . If no problem is found, go to step 9
8. Check IPC connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 11 . If no problem is found, go to step 10 .
9. Replace park switch . See **PARK/NEUTRAL POSITION SWITCH** under REMOVAL & INSTALLATION. When repair is complete, go to step 11 .
10. Replace IPC. See **INSTRUMENT PANEL CLUSTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
11. Operate system to verify normal operation. If PRNDL indicator is functioning properly, repair is complete. If PRNDL indicator is not operating properly, go to step 3 .

TEST J: DRIVER INFORMATION CENTER SWITCHES INOPERATIVE

1. Review Driver Information Center (DIC) operation. See **DRIVER INFORMATION CENTER** under OPERATION. When review of DIC operation is complete, go to next step.
2. Depress DIC switches. If switches operate properly, system is performing normally at this time. If switches do not operate normally, go to next step.
3. Replace DIC. See **DRIVER INFORMATION CENTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
4. Operate DIC and verify switches operate normally. If switches operate normally, repair is complete. If switches do not operate normally, go to step 2 .

TEST K: DRIVER INFORMATION CENTER COMPASS DISPLAY INOPERATIVE

1. Review Driver Information Center (DIC) operation. See **DRIVER INFORMATION CENTER** under OPERATION. When review of DIC operation is complete, go to next step.
2. Verify compass display is operating abnormally. If compass display is operating abnormally, go to next step. If compass is operating normally system is functioning properly at this time. Check wiring and connectors for poor connections and intermittent faults. See **WIRING DIAGRAMS** .
3. Attempt to operate other DIC functions. If other DIC functions operate properly, go to next step. If other DIC functions do not operate properly, repair by symptom. See **SYMPTOM INDEX** table.
4. Calibrate compass. See **COMPASS CALIBRATION** under PROGRAMMING. If compass operates normally, go to step 7 . If compass does not operate properly, go to next step.
5. Adjust compass variance. See **COMPASS MAGNETIC VARIATION ADJUSTMENT** under PROGRAMMING. If compass operates normally, go to step 7 . If compass does not operate normally, go to next step.

6. Replace DIC. See **DRIVER INFORMATION CENTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
7. Operate DIC and verify compass operates normally. If compass operates normally, repair is complete. If compass does not operate normally, go to step 2 .

TEST L: DRIVER INFORMATION CENTER TEMPERATURE DISPLAY ALWAYS READS OC

1. Review Driver Information Center (DIC) operation. See **DRIVER INFORMATION CENTER** under OPERATION. When review of DIC operation is complete, go to next step.
2. Turn ignition switch to OFF position. Disconnect outside temperature sensor electrical connector. Connect Signal Generator and Instrument Panel Tester (J33431-C) between air temperature sensor connector terminals. Turn ignition switch to ON position. Vary resistance on J33431-C while observing DIC temperature indication. With resistance at 2500 ohms, indicated temperature should read near 140°F (60°C). With resistance at 11,200 ohms, indicated temperature should read 81°F (27°F). If DIC display is as specified, go to step 5 . If display is not as specified, go to next step.
3. Check Light Green/Black wire between outside temperature sensor and DIC connector terminal No. 10. See **Fig. 12** . See **WIRING DIAGRAMS** . Check circuit for open or high resistance. Repair circuit as necessary, then go to step 9 . If no problem is found, go to next step.
4. Check Black/White wire between outside temperature sensor and ground for open or high resistance. See **WIRING DIAGRAMS** . Repair wiring as necessary, then go to step 9 . If no problems are found, go to step 6 .
5. Check outside temperature sensor connector for poor connection or corroded terminals. Repair connector as necessary, then go to step 9 . If no problems are found, go to step 7 .
6. Check DIC connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 8 .
7. Replace outside temperature sensor. When repair is complete, go to step 9 .
8. Replace DIC. See **DRIVER INFORMATION CENTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
9. Operate DIC system to verify proper operation of outside temperature sensor. If temperature sensor operates normally, system is functioning properly at this time. If outside temperature sensor is not operating properly, go to step 2 .

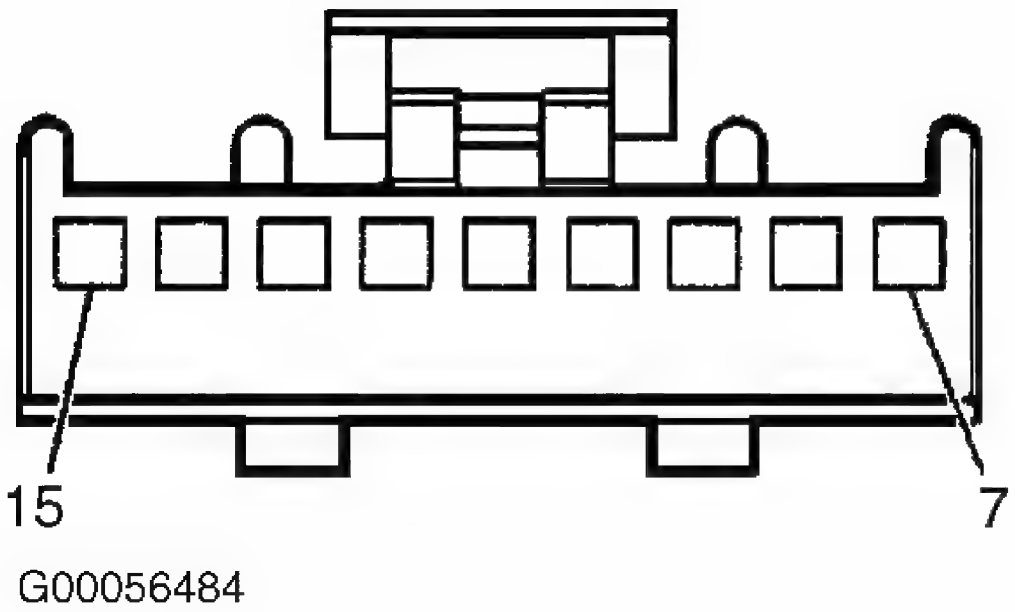


Fig. 12: Identifying Driver Information Center Connector Terminals
Courtesy of GENERAL MOTORS CORP.

TEST M: DRIVER INFORMATION CENTER TEMPERATURE DISPLAY ALWAYS READS SC

1. Review Driver Information Center (DIC) operation. See **DRIVER INFORMATION CENTER** under OPERATION. When review of DIC operation is complete, go to next step.
2. Turn ignition switch to OFF position. Disconnect outside temperature sensor electrical connector. Connect Signal Generator and Instrument Panel Tester (J33431-C) between air temperature sensor connector terminals. Turn ignition switch to ON position. Vary resistance on J33431-C while observing DIC temperature indication. With resistance at 2500 ohms, indicated temperature should read near 140°F (60°C). With resistance at 11,200 ohms, indicated temperature should read 81°F (27°F). If DIC display is as specified, go to step 4 . If display is not as specified, go to next step.
3. Check Light Green/Black wire between outside temperature sensor and DIC connector terminal No. 10. See **Fig. 12** . See **WIRING DIAGRAMS** . Check circuit for open or high resistance. Repair circuit as necessary, then go to step 7 . If no problem is found, go to step 6 .
4. Check outside temperature sensor connector for poor connection or corroded terminals. Repair connector as necessary, then go to step 7 . If no problems are found, go to next step.
5. Replace outside temperature sensor. When repair is complete, go to step 7 .

6. Replace DIC. See **DRIVER INFORMATION CENTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
7. Operate DIC system to verify proper operation of outside temperature sensor. If temperature sensor operates normally, system is functioning properly at this time. If outside temperature sensor is not operating properly, go to step 2 .

TEST N: DRIVER INFORMATION CENTER TEMPERATURE DISPLAY INACCURATE

1. Review Driver Information Center (DIC) operation. See **DRIVER INFORMATION CENTER** under OPERATION. When review of DIC operation is complete, go to next step.
2. Turn ignition switch to OFF position. Disconnect outside temperature sensor electrical connector. Connect Signal Generator and Instrument Panel Tester (J33431-C) between air temperature sensor connector terminals. Turn ignition switch to ON position. Vary resistance on J33431-C while observing DIC temperature indication. With resistance at 2500 ohms, indicated temperature should read near 140°F (60°C). With resistance at 11,200 ohms, indicated temperature should read 81°F (27°F). If DIC display is as specified, go to step 5 . If display is not as specified, go to next step.
3. Check Light Green/Black wire between outside temperature sensor and DIC connector terminal No. 10. See **Fig. 12** . See **WIRING DIAGRAMS** . Check circuit for open or high resistance. Repair circuit as necessary, then go to step 9 . If no problem is found, go to next step.
4. Check Black/White wire between outside temperature sensor and ground for open or high resistance. See **WIRING DIAGRAMS** . Repair wiring as necessary, then go to step 9 . If no problems are found, go to step 6 .
5. Check outside temperature sensor connector for poor connection or corroded terminals. Repair connector as necessary, then go to step 9 . If no problems are found, go to step 7 .
6. Check DIC connector for poor connection or corroded terminals. Repair connection as necessary, then go to step 9 . If no problem is found, go to step 8 .
7. Replace outside temperature sensor. When repair is complete, go to step 9 .
8. Replace DIC. See **DRIVER INFORMATION CENTER** under REMOVAL & INSTALLATION. When repair is complete, go to next step.
9. Operate DIC system to verify proper operation of outside temperature sensor. If temperature sensor operates normally, system is functioning properly at this time. If outside temperature sensor is not operating properly, go to step 2 .

TEST O: CHIME ALWAYS ON

1. If audible warnings diagnostic system check has been performed, go to next step. If audible warnings diagnostic system check has not been performed, go to **AUDIBLE WARNINGS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC

SYSTEM

2. Turn headlights off. Turn ignition switch to OFF position, then remove key. Close all doors. If chime sounds, go to next step. If chime does not sound, system is functioning properly at this time. Check wiring and connectors for intermittent connections or faults. See **WIRING DIAGRAMS** .
3. If warning indicators are illuminated on IPC while chime is sounding, audible warning system is functioning properly. Fault exists in other system. Repair as prescribed by appropriate repair procedure. If warning indicators are not illuminated, go to next step.
4. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Observe KEY IN IGNITION parameter in Body Control Module (BCM) data list while inserting and removing key from ignition. If KEY IN IGNITION parameter changes status, go to step 8 . If parameter does not change status, go to next step.
5. Check Light Green wire between ignition key alarm switch and BCM connector C2 terminal B9. See **Fig. 4** . See **WIRING DIAGRAMS** . Check wiring for open or short to ground. Repair circuit as necessary, then go to step 9 . If no problem is found, go to next step.
6. Check ignition key alarm switch connector for poor connections or corroded terminals. Repair connector as necessary, then go to step 9 . If no problem is found, go to next step.
7. Replace ignition switch. See appropriate STEERING COLUMN SWITCHES article. When repair is complete, go to step 9 .
8. Replace BCM. See appropriate BODY CONTROL MODULES article. When repair is complete, go to next step.
9. Operate system and verify chime operates properly. If chime operates properly, repair is complete. If chime does not operate properly, go to step 3 .

TEST P: CHIME INOPERATIVE

1. If audible warnings diagnostic system check has been performed, go to next step. If audible warnings diagnostic system check has not been performed, go to **AUDIBLE WARNINGS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM
2. Replace BCM. See appropriate BODY CONTROL MODULES article. When repair is complete, go to next step.
3. Operate system and verify chime operates properly. If chime operates properly, repair is complete. If chime does not operate properly, go to step 1 .

REMOVAL & INSTALLATION

WARNING: **Vehicles are equipped with air bag supplemental restraint system. Before attempting ANY repairs involving steering column, instrument panel or related components, see**

SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

DRIVER INFORMATION CENTER

Removal & Installation (With Sun Roof)

1. Remove sun roof control console retaining screw. Gently pry sun roof control console down from roof. Disconnect electrical connections from console, then remove sun roof control console.
2. Using flat-bladed tool, carefully remove display lens from sun roof control console. Disconnect Driver Information Center (DIC) module electrical connector. Remove DIC module from sun roof control console. To install, reverse removal procedure.

Removal & Installation (Without Sun Roof)

Remove Driver Information Center (DIC) module retaining screw. Gently pull console away from roof. Disconnect DIC electrical connector, then remove DIC. To install, reverse removal procedure.

INSTRUMENT PANEL

Removal & Installation

1. Disable air bag system. See AIR BAG RESTRAINT SYSTEM article in ACCESSORIES AND ELECTRICAL. Disconnect negative battery cable. Drain engine coolant. Remove heater hoses at core and plug core openings.
2. Remove right underdash hush panel. Remove screws for instrument panel glove box door, glove box and bezel. Disconnect electrical connector for glove box light and switch assembly. Remove door, compartment and bezel from instrument panel. Remove lower right instrument panel mounting bolt.
3. Remove center underdash hush panel. Remove left and right speaker grilles and speakers. Gently pry off defrost grille located on top of instrument panel.
4. Remove left underdash hush panel. Remove 4 screws attaching knee bolster below steering column. Set parking brake. Disconnect emergency brake release cable from ratchet mechanism. Move tilt steering column down (if equipped). Turn ignition key to

ON position and move automatic transmission gear selector to low (if equipped). Remove instrument panel accessory trim plate. See **Fig. 13** . Remove instrument cluster.

5. Remove connectors from Body Control Module (BCM). BCM is located on heater case in center of dash. Bend snap retainers away from BCM bracket to remove. See **Fig. 14** . Disconnect connectors on back of A/C-heater control panel and radio. Remove A/C-heater control panel and radio.
6. Remove 4 steering column retaining bolts and lower steering column. Remove instrument panel support screws and bolts. Roll instrument panel toward rear of vehicle. Disconnect necessary electrical connectors. Remove instrument panel. See **Fig. 13** .. To install, reverse removal procedure.

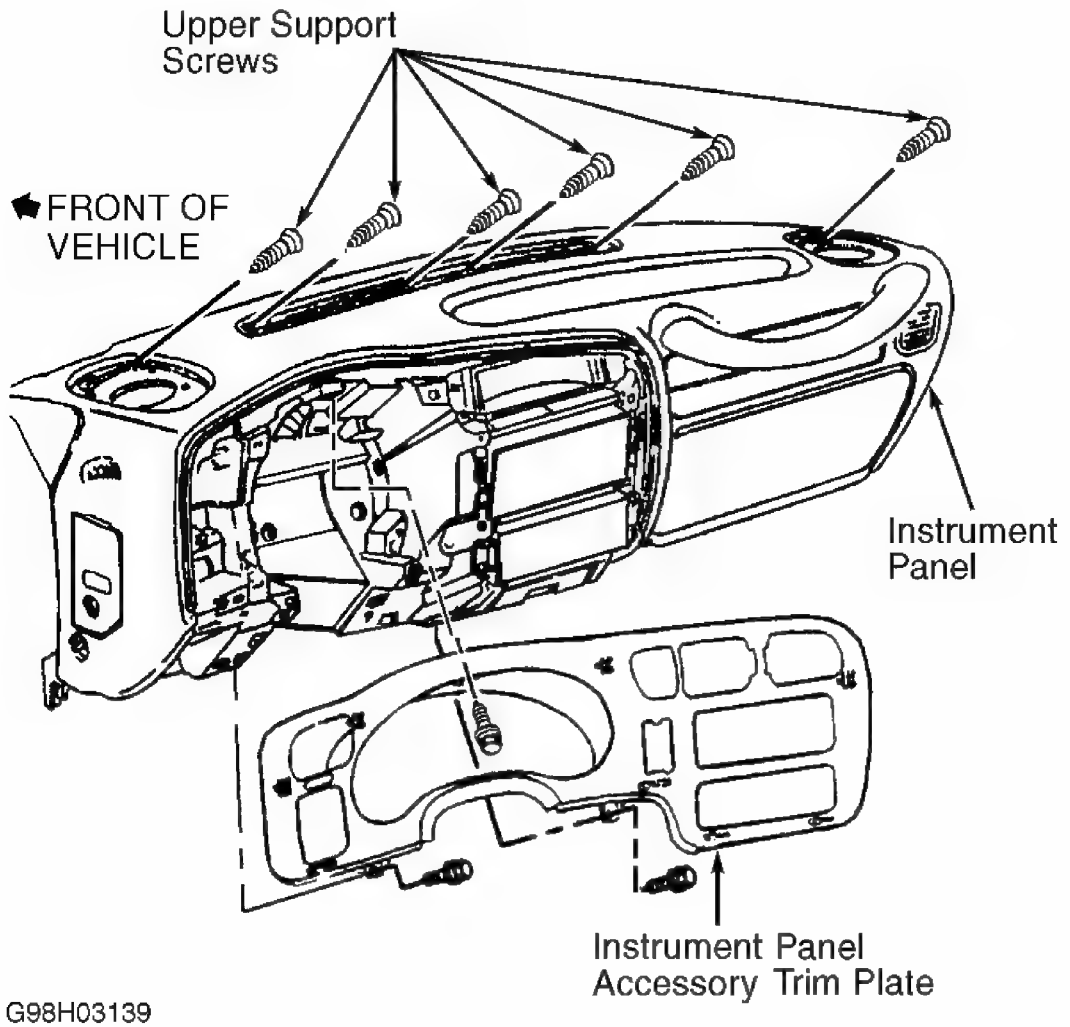


Fig. 13: Exploded View Of Instrument Panel & Accessory Trim Plate
Courtesy of GENERAL MOTORS CORP.

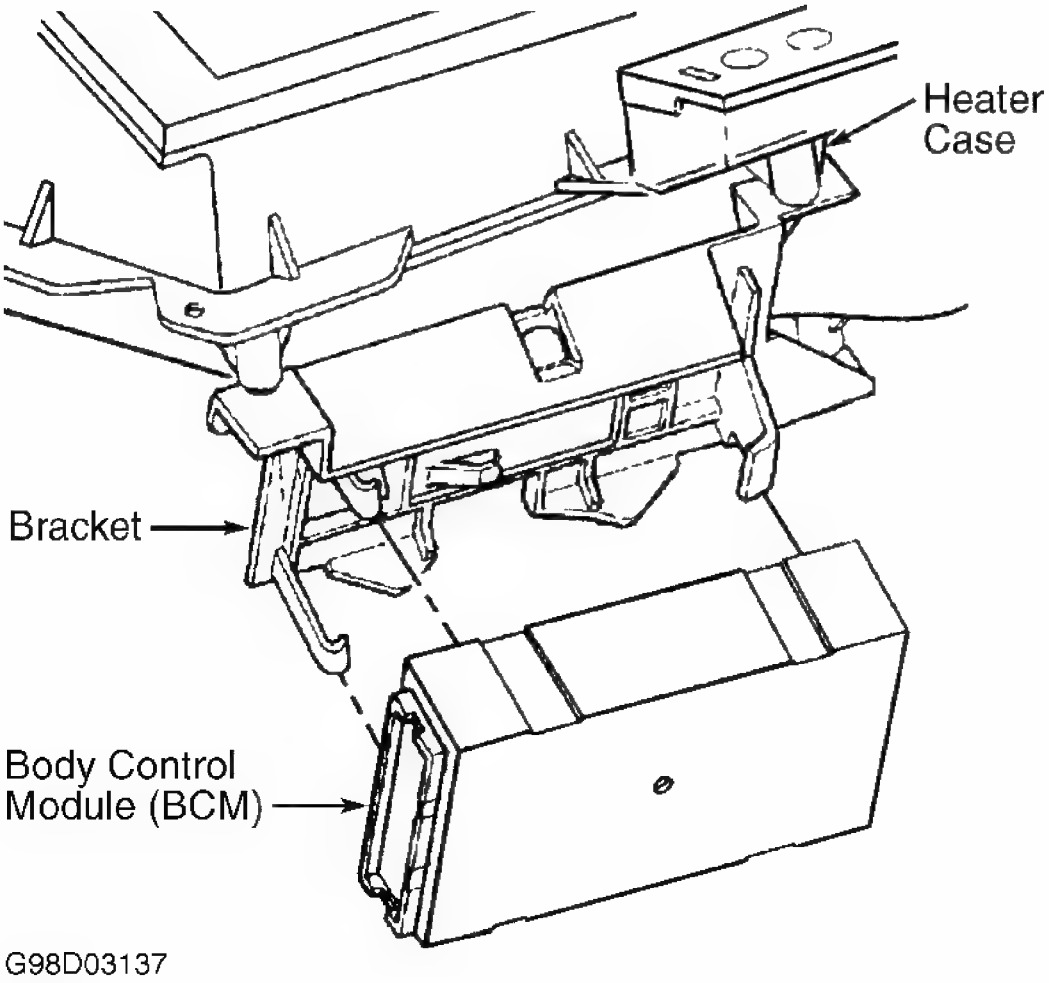


Fig. 14: Body Control Module Mounting
Courtesy of GENERAL MOTORS CORP.

INSTRUMENT PANEL CLUSTER

Removal & Installation

1. Disconnect negative battery cable. Remove Data Link Connector (DLC) from lower steering column trim panel. Disconnect remote control door lock receiver module electrical connectors. Remove lower steering column trim panel. Disconnect parking brake release cable from parking brake actuator. Remove courtesy light from knee bolster. Remove knee bolster.
2. Remove instrument panel trim plate-to-instrument panel retaining screws. Remove trim plate from instrument panel. Remove 4 instrument cluster-to-instrument panel retaining screws. See **Fig. 15** . Disconnect electrical connectors. Remove instrument cluster. To install, reverse removal procedure.

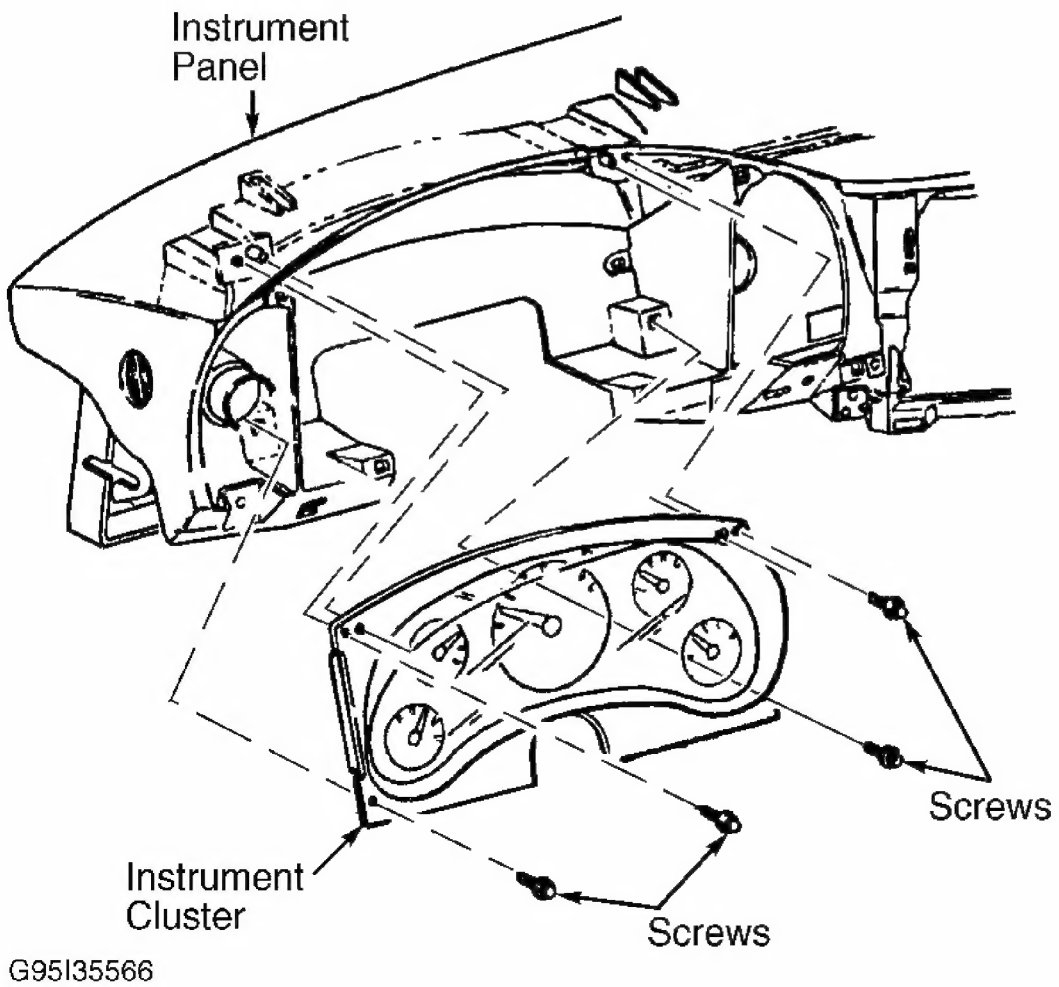


Fig. 15: Exploded View Of Instrument Cluster (Typical)
Courtesy of GENERAL MOTORS CORP.

PARK/NEUTRAL POSITION SWITCH

Removal

Apply parking brake. Place transmission shift lever in Neutral position. Raise and support vehicle. Remove transmission control lever retaining nut and transmission control lever. Remove PNP switch retaining bolts. Disconnect PNP switch wiring at in-line harness connector, located several inches from PNP switch. Using a file, remove any burrs from outer edge of manual shaft. Remove PNP switch from manual shaft.

Adjustment & Installation

Install PNP switch onto manual shaft. Install PNP switch retaining bolts, but do not tighten. Position PNP Switch Aligner (J-41364-A) onto PNP switch. Rotate PNP switch aligner until

upper locating pin is lined up with slot on top of PNP switch. Tighten PNP switch retaining bolts to 18 ft. lbs. (25 N.m). Install transmission control lever onto manual shaft. Install and tighten transmission control lever retaining nut to 18 ft. lbs. (25 N.m). Lower vehicle. Check switch for proper operation. Repeat procedure as necessary until engine starts in Park and Neutral positions only.

WIRING DIAGRAMS

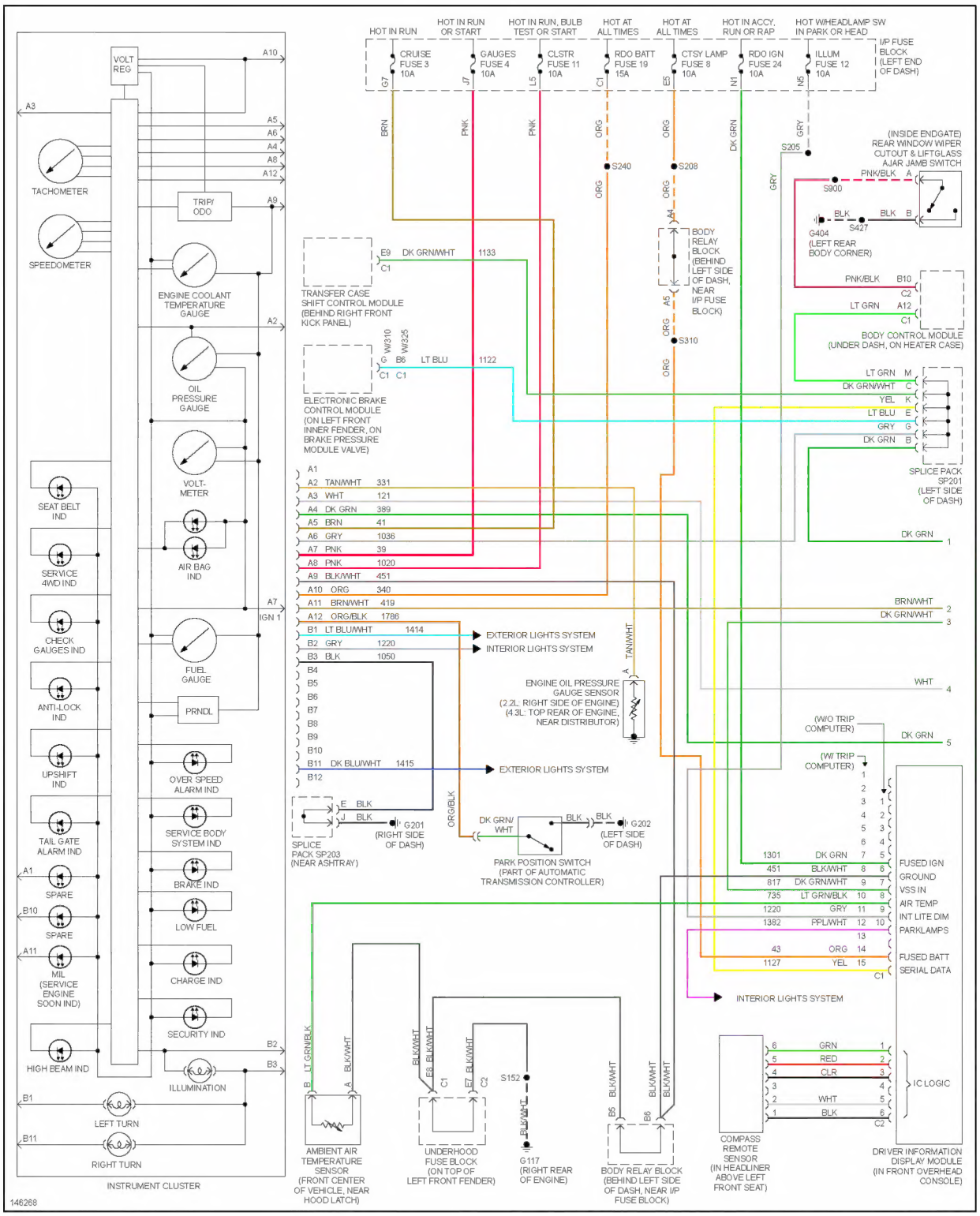


Fig. 16: Analog Instrument Panels (Blazer, Bravada, Jimmy, Sonoma & S10 Pickup - 1 Of 2)

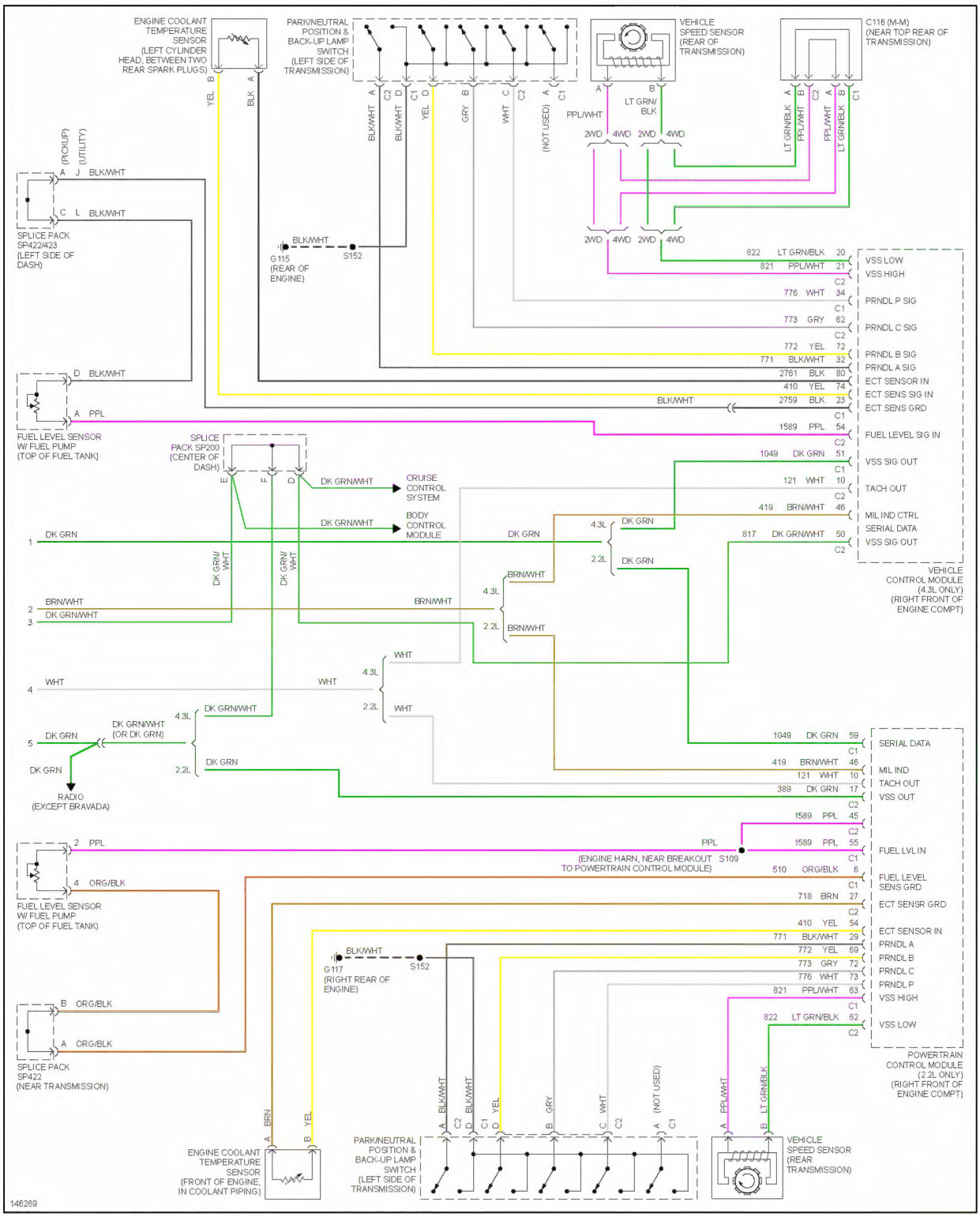


Fig. 17: Analog Instrument Panels (Blazer, Bravada, Jimmy, Sonoma & S10 Pickup - 2 Of 2)